AMENDING THE GEOTHERMAL STEAM ACT OF 1970

HEARING

BEFORE THE

SUBCOMMITTEE ON
ENERGY AND MINERAL RESOURCES

OF THE

COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

NINETY-SEVENTH CONGRESS

FIRST SESSION

ON

S. 669

A BILL TO AMEND THE EXISTING GEOTHERMAL LEASING AND PERMITTING LAWS, AND FOR OTHER PURPOSES

S. 1516

A BILL TO AMEND THE GEOTHERMAL STEAM ACT OF 1970 (30 U.S.C. 1001 ET SEQ.) TO EXPEDITE EXPLORATION AND DEVELOPMENT OF GEOTHERMAL RESOURCES

OCTOBER 27, 1981

Publication No. 97–57

PART 1

Printed for the use of the
Committee on Energy and Natural Resources

U.S. GOVERNMENT PRINTING OFFICE
88-975 O WASHINGTON : 1982

5311-16

COMMITTEE ON ENERGY AND NATURAL RESOURCES

JAMES A. McCLURE, Idaho, *Chairman*

MARK O. HATFIELD, Oregon
LOWELL P. WEICKER, Jr., Connecticut
PETE V. DOMENICI, New Mexico
MALCOLM WALLOP, Wyoming
JOHN W. WARNER, Virginia
GORDON J. HUMPHREY, New Hampshire
FRANK H. MURKOWSKI, Alaska
DON NICKLES, Oklahoma
JOHN P. EAST, North Carolina
JOHN HEINZ, Pennsylvania

HENRY M. JACKSON, Washington
J. BENNETT JOHNSTON, Louisiana
DALE BUMPERS, Arkansas
WENDELL H. FORD, Kentucky
HOWARD M. METZENBAUM, Ohio
SPARK M. MATSUNAGA, Hawaii
JOHN MELCHER, Montana
PAUL E. TSONGAS, Massachusetts
BILL BRADLEY, New Jersey

Michael D. Hathaway, *Staff Director*
Charles A. Trabandt, *Chief Counsel*
D. Michael Harvey, *Chief Counsel for the Minority*

Subcommittee on Energy and Mineral Resources

JOHN W. WARNER, Virginia, *Chairman*

JOHN HEINZ, Pennsylvania
GORDON J. HUMPHREY, New Hampshire
MALCOLM WALLOP, Wyoming
FRANK H. MURKOWSKI, Alaska

SPARK M. MATSUNAGA, Hawaii
J. BENNETT JOHNSTON, Louisiana
DALE BUMPERS, Arkansas
BILL BRADLEY, New Jersey

James A. McClure and Henry M. Jackson are Ex Officio Members of the Subcommittee
Roger Sindelar, *Counsel*

CONTENTS

Page
S. 669 5
S. 1516 27

STATEMENTS

Bloomquist, Dr. R. Gordon, geothermal specialist, Washington State Energy Office 77
Buchwald, Rudy, vice president, geothermal operations, Sunoco Energy Development Co., accompanied by Fred Craft, manager, external affairs, Sunoco Energy Development Co.; and Richard Bliss 103
Clausen, Hon. Don H., a U.S. Representative from the State of California 48
Craft, Fred, manager, external affairs, Sunoco Energy Development Co 111
Dickenson, Russell E., Director, National Park Service, Department of the Interior 67
Jackson, Hon. Henry M., a U.S. Senator from the State of Washington 41
Jarvis, T. Destry, director of Federal activities, National Parks and Conservation Association 128
McClure, Hon. James A., a U.S. Senator from the State of Idaho 42
Russell, David C., Deputy Assistant Secretary, Land and Water Resources, Department of the Interior, accompanied by Dr. Raymond Herrmann, director, Water Resources Laboratory, National Park Service; and Dr. Roy Bailey, Coordinator, Volcano Hazards Program, U.S. Geological Survey 56
Sopher, Terry, the Wilderness Society 118
Wallop, Hon. Malcolm, a U.S. Senator from the State of Wyoming 38
Warner, Hon. John W., a U.S. Senator from the State of Virginia 1
Wilson, Joseph L., vice president and general representative, Union Geothermal Division, Union Oil Co. of California 93
Wright, Robert L., land manager, Phillips Petroleum Co 112

APPENDIX

Additional material submitted for the record 139

AMENDING THE GEOTHERMAL STEAM ACT OF 1970

TUESDAY, OCTOBER 27, 1981

U.S. SENATE,
SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10:03 a.m., in room 3110, Dirksen Office Building, Hon. John W. Warner, presiding.

Present: Senators Warner, McClure, and Wallop.

Also present: Roger Sindelar, counsel; Robert Terrell, professional staff member; D. Michael Harvey, chief counsel for the minority; Craig Gannett, professional staff member for the minority; and Ron Andes, congressional fellow.

OPENING STATEMENT OF HON. JOHN W. WARNER, A U.S. SENATOR FROM THE STATE OF VIRGINIA

Senator WARNER. Today we consider an omnibus geothermal resource bill, S. 669, introduced by Senator Jackson, and S. 1516 introduced by myself and Mr. McClure on July 23, 1981.

Before we begin this hearing on this very important issue I would like to announce that Senator McClure, Senator Wallop, and myself have entered into an agreement that any geothermal legislation reported by this committee will include an acceptable resolution which will protect the nationally significant thermal features of Yellowstone National Park.

We have agreed further that such a resolution requires additional investigation of all relevant information regarding geothermal development near Yellowstone Park, and to that end we have agreed that Senator Wallop and his Subcommittee on Public Lands and Reserved Water at the earliest time convenient with the Senator's schedule will hold a field hearing in Wyoming and make recommendations to this committee resulting from that hearing on measures to provide improved protection for the nationally significant thermal features of Yellowstone Park. Further I would like to announce that yesterday Senator McClure, Senator Wallop, and myself received a written commitment from the Secretary of the Interior to support this effort.

[The prepared statement of Senator Warner and the texts of S. 669 and S. 1516 follow:]

OPENING STATEMENT OF SENATOR WARNER
CHAIRMAN OF THE SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES
HEARING ON S. 669 AND S. 1516

TODAY WE CONSIDER OMNIBUS GEOTHERMAL RESOURCE LEGISLATION, S. 669 INTRODUCED BY SENATOR JACKSON ON MARCH 10, AND S. 1516 INTRODUCED BY SENATOR McCLURE AND MYSELF ON JULY 23, 1981.

BEFORE WE BEGIN THIS HEARING ON THIS IMPORTANT ISSUE I WOULD LIKE TO ANNOUNCE THAT SENATOR McCLURE, SENATOR WALLOP AND MYSELF HAVE ENTERED INTO AN AGREEMENT THAT ANY GEOTHERMAL LEGISLATION REPORTED BY THIS COMMITTEE WILL INCLUDE AN ACCEPTABLE RESOLUTION WHICH WILL PROTECT THE NATIONALLY SIGNIFICANT THERMAL FEATURES OF YELLOWSTONE NATIONAL PARK.

WE HAVE AGREED FURTHER THAT SUCH A RESOLUTION REQUIRES ADDITIONAL INVESTIGATION OF ALL RELEVANT INFORMATION REGARDING GEOTHERMAL DEVELOPMENT NEAR YELLOWSTONE NATIONAL PARK AND TO THAT END WE HAVE AGREED THAT SENATOR WALLOP AND HIS SUBCOMMITTEE ON PUBLIC LANDS AND RESERVED WATER AT THE EARLIEST TIME CONVENIENT WITH THE SENATOR'S SCHEDULE WILL HOLD A FIELD HEARING IN WYOMING AND MAKE RECOMMENDATIONS TO THIS COMMITTEE RESULTING FROM THAT HEARING ON MEASURES TO PROVIDE ADEQUATE PROTECTION FOR THE NATIONALLY SIGNIFICANT THERMAL FEATURES OF THAT PARK.

YESTERDAY SENATOR McCLURE, SENATOR WALLOP AND MYSELF RECEIVED A WRITTEN COMMITMENT FROM THE SECRETARY OF THE INTERIOR TO SUPPORT THIS EFFORT.

IT HAS BEEN LONG RECOGNIZED THAT GEOTHERMAL RESOURCES, THE USE OF THE EARTH'S NATURAL HEAT FOR ENERGY PRODUCTION, ONE OF AMERICA'S CLEANEST, SAFEST AND MOST ABUNDANT RESOURCES, HAS NOT BEEN COMMERCIALIZED TO ANY GREAT DEGREE BECAUSE OF FEDERAL LEASING POLICIES AND OTHER INSTITUTIONAL AND ECONOMIC CONSTRAINTS.

GEOTHERMAL ENERGY, BE IT DRY-STEAM, LIQUID-DOMINATED, HOT-DRY ROCK OR GEOPRESSURE, CAN MAKE A SIGNIFICANT NEAR-TERM CONTRIBUTION, BOTH TO INCREASING DOMESTIC ENERGY SUPPLIES AND TO REDUCING OUR DEPENDENCE ON IMPORTED OIL.

TEN OTHER NATIONS, INCLUDING SOME LESS DEVELOPED COUNTRIES, HAVE BEEN PRODUCING GEOTHERMAL ELECTRIC POWER FOR YEARS. ANOTHER 55 NATIONS HAVE IDENTIFIED GEOTHERMAL RESOURCES AND MANY ARE MOVING TOWARD EARLY EXPLOITATION.

DESPITE THE FACT THAT HERE IN THE UNITED STATES, THE UNITED STATES GEOLOGICAL SURVEY HAS IDENTIFIED POTENTIAL GEOTHERMAL RESOURCES IN 43 STATES, ONLY ONE COMMERCIAL-SCALE POWERPLANT AT THE GEYSERS NEAR SAN FRANCISCO UTILIZED A DRY STEM RESOURCE REPRESENTING AS LITTLE AS ONE-HALF PERCENT OF THE TOTAL U.S. RESOURCES BASE. THE

MORE WIDE-SPREAD GEOTHERMAL RESOURCE IS LIQUID DOMINATED AND IS REPRESENTED BY APPROXIMATELY 80% OF THOSE KNOWN RESERVOIRS WHICH MIGHT BE UTILIZED FOR THE GENERATION OF ELECTRICITY. OTHER DOMESTIC GEOTHERMAL RESOURCES NOT APPLICABLE FOR ELECTRIC GENERATION ARE AVAILABLE FOR INDUSTRIAL AND AGRICULTURAL PROCESSING AND FOR HOME AND COMMERCIAL HEATING PURPOSES.

AN EXAMPLE OF THE TREMENDOUS POTENTIAL REPRESENTED BY THIS RENEWABLE DOMESTIC RESOURCE IS THE BROAD GEOGRAPHIC DISTRIBUTION OF GEOTHERMAL RESOURCE DEVELOPMENT. EXPLORATION AND/OR DEVELOPMENT EFFORTS HAVE BEEN UNDERTAKEN IN WIDE-RANGING STATES FROM CALIFORNIA AND THE UPPER NORTHWEST TO DELAWARE, MARYLAND, AND VIRGINIA: AND FROM IDAHO TO TEXAS AND LOUISIANA IN THE SOUTH. INDEED, A U.S. GOVERNMENT COORDINATING COUNCIL ESTIMATES GEOTHERMAL PRODUCTION BY THE YEAR 2000 EQUIVALENT TO 2.2 QUADS OF FOSSIL FUEL INPUT OR ABOUT 1 MILLION BARRELS OF OIL PER DAY. THE GEYSERS IN NORTHERN CALIFORNIA PRODUCES OVER 50% OF SAN FRANCISCO'S ELECTRICAL POWER. AND OTHER GEOTHERMAL HEAT USES EQUIVALENT TO 1 QUAD OF FOSSIL FUEL INPUT OR ABOUT 500,000 BARRELS OF OIL PER DAY. OTHER USES FOR GEOTHERMAL RESOURCE OUTSIDE OF ELECTRIC POWER GENERATION IS IN HOME HEATING. IN CHAIRMAN'S McCLURE'S HOME STATE OF IDAHO 250 RESIDENTIAL UNITS HAVE BEEN HOOKED UP TO THE BOISE/WARM SPRINGS GEOTHERMAL SYSTEM SINCE 1892. MOREOVER, APPLICATIONS FOR APPROXIMATELY 450 UNITS ARE PENDING WITHIN THE SYSTEM AND WILL BE ADDED EARLY NEXT YEAR.

THE U.S. GENERAL ACCOUNTING OFFICE, IN ITS JANUARY 1980 REPORT TO CONGRESS (EMD-80-36), ADDRESSED THE OBSTACLES TO GEOTHERMAL DEVELOPMENT AND UTILZIATION. THIS REPORT REFERRED TO THE EFFECT OF "COMPLEXITIES OF ADMINISTRATIVE AND REGULATORY REQUIREMENTS ON DEVELOPMENT...". IT SUGGESTED THAT AMENDMENTS TO THE 1970 STEAM ACT"...WOULD PROVIDE ADDITIONAL FEDERAL INITIATIVES AND INCENTIVES AIMED AT FURTHER ACCELERATING GEOTHERMAL ENERGY'S DEVELOPMENT AND USE."

WE SHOULD BE MOTIVATED NOT ONLY BY THE ABUNDANCE AND ENVIRONMENTALLY SOUND NATURE OF THIS RESOURCE BUT BY THE FACT THAT, BASED ON OUR ONE COMMERICAL EXPERIENCE AT THE GEYSERS, GEOTHERMAL PRODUCED POWER IS COMPETITIVE WITH OTHER ENERGY RESOURCES. STILL FURTHER INCENTIVE TO REMOVE FEDERAL CONSTRAINTS IS THE RELIABILITY OF THIS RESOURCE AS DEMONSTRATED BY THE COMMERICAL MEXICAN POWERPLANT

AT CERRO PRIETO. THIS PLANT, IN OPERATION FOR SEVEN YEARS, HAS ATTAINED A 90% AVAILABILITY WHICH MEANS THAT ITS FULL CAPACITY HAS BEEN AVAILABLE 90% OF THE TIME. THIS FIGURE FAR EXCEEDS THE AVERAGE AVAILABILITY OF FOSSIL-FIRED POWERPLANTS IN THE UNITED STATES.

GENTLEMEN, IT IS INCONCEIVABLE THAT THE UNITED STATES SHOULD IGNORE DOMESTIC GEOTHERMAL DEVELOPMENT, WHICH COULD DRASTICALLY OFF-SET OIL IMPORTS WHEN, AT THE SAME TIME, OIL EXPORTING NATIONS SUCH AS MEXICO, KUWAIT, SAUDI ARABIA, VENEZULA AND THE UNITED ARAB IMIRATES PURSUE THEIR OWN GEOTHERMAL EXPLORATION AND DEVELOPMENT.

THE CONGRESS HAS THE OPPORTUNITY NOW, WITHOUT ADVERSELY AFFECTING THE BUDGET OR U.S. REVENUES, TO REMOVE SERIOUS IMPEDIMENTS TO U.S. GEOTHERMAL DEVELOPMENT AND COMMERCIALIZATION. THE GEOTHERMAL STEAM ACT OF 1970 MUST BE AMENDED TO INCREASE LEASEHOLD LIMITATIONS, REMOVE THOSE CONSTRAINTS WHICH ACT AS A DISINCENTIVE FOR PRIVATE INVESTMENT IN THE EXPLOITATION OF AMERICA'S GEOTHERMAL RESOURCES.

THE BILLS INTRODUCED BY SENATOR JACKSON AND SENATOR McCLURE AND MYSELF WILL REMOVE MANY OF THE SERIOUS IMPEDIMENTS TO THE DEVELOPMENT OF AMERICA'S GEOTHERMAL RESOURCE.

II

97TH CONGRESS
1ST SESSION

S. 669

To amend the existing geothermal leasing and permitting laws, and for other purposes.

IN THE SENATE OF THE UNITED STATES

MARCH 10 (legislative day, FEBRUARY 16), 1981

Mr. JACKSON introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

---

A BILL

To amend the existing geothermal leasing and permitting laws, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Geothermal Steam Act Amendments of 1981".

PURPOSE

SEC. 101. It is the purpose of this Act to—

(1) effect a major overhaul of Federal geothermal leasing procedures to support a significant acceleration

in the development of geothermal resources on Federal lands;

(2) modify the Geothermal Steam Act of 1970 to facilitate and require diligent exploration and development of geothermal resource leaseholds;

(3) assure competition in the geothermal industry; and

(4) protect nationally significant thermal features in national parks and monuments.

SEC. 102. As used in this title, "Act" means the Geothermal Steam Act of 1970 (Public Law 91–581).

SEC. 103. Subsection 2(c) of the Act is amended by deleting therefrom the words "steam and associated geothermal", and adding thereto after the word "brines" in the first instance in which it appears, the phrase "geopressured water, magma, and hot rock formations".

SEC. 104. Subsection 2(d) of the Act is amended by deleting therefrom the word "steam" in both instances in which it appears, and substituting therefor the word "resources" in each instance.

SEC. 105. Section 2 of the Act is amended by deleting subsection (e) and inserting the following:

"(e) 'known geothermal resources area' means an area designated by the Secretary as known geothermal resources area prior to October 1, 1979, under this

Act, or an area for which there is substantial physical evidence including but not limited to the geology of or a discovery on such lands, which would, in the opinion of the Secretary, engender a belief in persons who are experienced in the subject matter that the prospects for extraction of geothermal resources for the primary purpose of generating electricity in commercial quantities warrant substantial expenditures for that purpose.

"Any known geothermal resources area which receives no bids when offered for sale shall be declassified and leased to the first noncompetitive applicant: *Provided,* That the Secretary's authority to reclassify such lands as known geothermal resources areas at a later date on the basis of new information shall not be affected.".

SEC. 106. Section 3 of the Act is amended by deleting therefrom the words "steam and associated geothermal", by deleting the words "and (3)", and by adding in their place the following: "(3) in any lands withdrawn or acquired in aid of the functions of any department or agency of the Federal Government, including the Department of Defense, and (4)".

SEC. 107. (a) Section 4 of the Act is amended by deleting the first two sentences thereof and replacing them with the following: "Lands subject to leasing under this Act shall be leased or offered for lease in the manner described in this section.

"(a) If the Secretary determines that lands within a known geothermal resources area are to be leased, the Secretary shall seek to offer them for lease to the highest qualified bidder by competitive sale within eighteen months after nomination in writing from any qualified bidder. No person may submit in any calendar year such nominations for lands exceeding fifty-one thousand two hundred acres in any State: *Provided,* That the Secretary may permit a person to nominate more than fifty-one thousand two hundred acres in a given year if he determines, based on ecological, technical, or geologic evidence, that this is justified. The Secretary shall attempt to offer 10 per centum of all lands offered for sale in any year on a basis other than cash bonus bidding, employing those bidding systems set forth in section 8(a)(1) of the Outer Continental Shelf Lands Act, as amended (43 U.S.C. 1335).

"(b)(1) Any qualified person may apply for a lease on lands not within a known geothermal resources area. If the Secretary determines that the lands are to be leased, the Secretary shall seek to offer them for lease to the applicant within eighteen months of initial application except as provided below.

"(2) The Secretary may deny issuance of a lease. A statement of the reasons for any decision not to lease shall be made public within eighteen months of nomination or application in the event the requested or nominated tract is not offered.

"(3) The Secretary shall provide for expedited processing of lease applications for which the applicant provides significant evidence of readiness to commence exploration or development operations.

"(c) Subsections (a) and (b) of this section shall take effect with respect to all applications filed with the Secretary on or after the date of the enactment of the Geothermal Steam Act Amendments of 1980. In the case of applications for geothermal leases for lands which were not or are not designated by the Secretary as known geothermal resources areas within eighteen months after the application, the original first qualified applicant shall be entitled to a lease on a noncompetitive basis if a lease is issued, regardless of any subsequent known geothermal resources area designation. If an applicant conducts exploration activities which result in geothermal resource discoveries sufficient to require known geothermal resources area designation also covering lands for which his lease application was made prior to such discoveries, he shall be entitled to the lease on a noncompetitive basis of lands covered by any application in the known geothermal resources area, if a lease is issued, regardless of such discovery or an expression of competitive interest made after the discovery.

"(d) Notwithstanding the first sentence of section 4(a), any qualified person first making application for a geothermal lease of lands under this Act (which are designated by the Secretary as known geothermal resources areas on the date of such application, but which are so designated within eighteen months after the date of such application) shall be entitled to a noncompetitive lease of such lands, if a lease is issued, under this subsection at a rate determined on the basis of competitive bidding. No person otherwise entitled to a lease of such lands under such competitive bidding (hereinafter in this section referred to as the competitive bidding applicant) shall be entitled to a lease covering such lands if the noncompetitive applicant referred to in this subsection agrees to enter into a lease of such lands within such reasonable period following the competitive bidding as the Secretary deems appropriate and at a rate which is equal on a per acre basis, to the rate at which such lands would have been leased to the competitive bidding applicant.

"(e) In the case of applications for geothermal leases under this Act of any lands which were not designated by the Secretary as a known geothermal resources area before the date of enactment of this section, if such applications were filed with the Secretary before such date of enactment but were not approved or rejected by the Secretary before such date, the qualified person first making application for such a lease shall be entitled to a lease of such lands, if a lease is so issued, without competitive bidding notwithstanding the first sentence of section 4(a) unless such lands are so designated within eighteen months after the date of enactment of this Act. If such lands are so designated within such eighteen-month period, such applicant shall be entitled to a noncompetitive lease of such lands under this subsection at a rate determined on the basis of competitive bidding. No competitive bidding applicant shall be entitled to a lease covering such lands if the noncompetitive applicant referred to in this subsection agrees to enter into a lease of such lands within such reasonable period following the competitive bidding as the Secretary deems appropriate and at a rate which is proportionate, on a per acre basis, to the rate at which such lands would have been leased to the competitive bidding applicant.

"(f) The Secretary may allow exploration and testing activities on lands subject to wilderness study under section 603 of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1782) and on lands within the National Forest System which have been identified in Executive Communication Numbered 1504, Ninety-sixth Congress for further planning. Such exploration and testing activities shall be deemed not to impair the suitability of the lands involved for inclusion in the National Wilderness Preservation System. The Secretary shall include in the lease stipulations to assure that exploration and testing activities do not permanently impair the wilderness values of the lands subject to such activities.

"(g)(1) The Secretary shall to the maximum extent practicable, develop within one year after enactment of this section uniform national, State, and regional standards and criteria to employ in deciding whether to approve or deny permits for exploration and testing of geothermal resources under this Act. Such standards shall be incorporated in and coordinated with land use management plans.

"(2) To the maximum extent possible, any requirements of section 102(2)(C) of the National Environmental Policy Act applicable to any such exploration and testing activities shall be deemed to be satisfied by any action by the Secretary pursuant to such section 102(2)(C) during the establishment of the procedures required by this subsection and application of these standards and criteria to such exploration and testing activities on a case-by-case basis.".

SEC. 108. Subsection 5(d) of the Act is amended by deleting therefrom the words "steam and byproduct" and substituting therefor the word "resources".

SEC. 109. Subsection 6(a) of the Act is amended by deleting therefrom the words "steam is" in both instances and by substituting therefor in both instances "resources are".

SEC. 110. Subsection 6(b) of the Act is amended by deleting therefrom the words "steam is" and substituting therefor the words "geothermal resources are".

SEC. 111. Subsection 6(c) of the Act is amended by deleting the words "steam is" in both instances in which they appear, substituting therefor the words "resources are" in the first instance, and substituting therefor the words "geothermal resources are" in the second instance.

SEC. 112. Subsection 6(d) of the Act is amended by adding, after the words "delivery to or utilization by" the following: ", or in the case of utilization facilities to be owned by the lessee, proof of commitment to construct".

SEC. 113. Subsections 6(d) and 6(e) of the Act are amended by deleting the word "steam" wherever it appears and substituting the word "resources" in each instance.

SEC. 114. Section 6(f) of the Act is amended by deleting therefrom the words "steam and associated geothermal".

SEC. 115. (a) Section 7 of the Act is amended by striking out "twenty thousand four hundred and eighty" and inserting in lieu thereof "fifty-one thousand two hundred".

(b) Section 7 of the Act is further amended by striking out the second paragraph and by adding in lieu thereof the following: "Any lease which contains a well shown to be capable of being commercially productive as determined by the United States Geological Survey shall be exempted from the acreage limitation contained in the preceding sentence.".

SEC. 116. Section 8 of the Act is amended by deleting therefrom the words "steam is" in both instances in which they appear, and substituting therefor the words "resources are" in both instances; and by deleting the word "ten" in both instances in which it appears and inserting in lieu thereof the word "twenty" in both instances.

SEC. 117. Section 9 of the Act is amended by deleting therefrom the word "steam" and substituting therefor the word "resources".

SEC. 118. (a) Section 15(b) of the Act is amended by adding at the end thereof the following: "Geothermal leases for lands withdrawn or acquired in aid of functions of the Department of Defense may be issued only with the consent of, and subject to such terms and conditions as may be prescribed by, the head of that Department to insure adequate utilization of the lands for the purpose for which they were withdrawn or acquired. The Secretary shall consult with the head of any other Federal agency or department for whose purposes lands have been withdrawn or acquired to determine appropriate terms or conditions prior to issuing leases for such lands.".

(b) Section 15 of the Act is amended by adding new subsections (d) and (e) as follows:

"(d) The head of the Federal agency or department which administers land leased or subject to leasing shall, in making decisions affecting the purchase, exchange, leasing, protection, and use of said or adjacent lands, take account of their potential for geothermal resources development.".

SEC. 119. Section 19 of the Act is amended by deleting therefrom the word "steam" and substituting therefor the word "resources".

SEC. 120. Section 23 of the Act is amended by deleting the words "steam and associated geothermal" in both instances in which they appear, and by adding after subsection 23(b) the following paragraphs:

"(c) Notwithstanding any other provision of this Act, the Secretary is authorized, and directed, pursuant to such regulations as he shall promulgate, to grant at no cost a permit for use of a geothermal resource to the surface owner or lawful occupant of lands subject to this Act, if the use of the geothermal resource is direct by such person in a residence, farm, or small business property, does not involve any generation of electricity, does not involve sale of the resource in commerce, does not involve commercial development of the resource, and involves only relatively small quantities of such resource. The use of the geothermal resource pursuant to such a permit shall not be inconsistent with any lease issued pursuant to this Act prior to the grant of the permit. Any lease issued subsequent to the grant of such permit shall, to the maximum extent practicable, not be inconsistent with such permit. The granting of a permit pursuant to this section shall not be subject to the requirements of section 102(2)(C) of the National Environmental Policy Act.

"(d) The head of each agency may develop for the use or benefit of his respective agency any geothermal energy resource within lands under his jurisdiction: *Provided,* That the head of such agency shall determine in writing, after consultation with the Department of the Interior and the Department of Energy and after opportunity for public comment (after publication in the Federal Register and a newspaper of general publication in the vicinity), that such utilization is in the public interest, and will not deter commercial development (except commercial development solely or primarily based on the sale of the geothermal resource to such agency) which might otherwise be conducted for such resource if it were offered for lease under this Act. Such Federal agency shall be authorized to sell or transfer at a reasonable rate incidental quantities of the geothermal resource to the surrounding community. If no further development by commercial interests occurs after a reasonable period of time, such Federal agency may sell or transfer at reasonable rates to the surrounding community such quantities of the geothermal resource as may be available from the production and are in excess of the requirements of the agency.".

SEC. 121. Section 24 is amended by designating the present provisions as subsection (a) redesignating (a), (b), (c), (d), (e), (f), (g), (h), and (i), as (i), (ii), (iii), (iv), (v), (vi), (vii), (viii), and (ix), and by adding the following:

"(b) The Secretary shall seek to make a decision on any permit to conduct drilling of exploratory or development wells, within one hundred and fifty days after the filing of such application. The Secretary shall seek to make a decision on a complete application to conduct development activities within nine months of application. The Secretary may for good cause extend the period for a decision on any permit or application for an additional period determined to be reasonable in specific cases, not to exceed ninety days.

In the event of any such extension—

(i) the payment of rental shall be suspended for the period of the extension; and

(ii) the running time of the lease shall be suspended for the nine months or one hundred and fifty days, as the case may be, plus the period of the extension.

Such suspensions shall not include any delay resulting from a failure on the part of the applicant to satisfy the requirements for an application.

"(c) A lease application shall be reviewed and an initial report prepared within sixty days of filing, indicating the results of the initial review, what disposition is proposed, and the projected time to complete action on the application.

"(d) A permit application, pursuant to a lease, shall be reviewed and an initial report prepared within sixty days of filing, indicating the results of the initial review, what disposition is proposed, and the projected time to complete action on the application.

"(e) The Secretary shall establish requirements for diligent operations which shall require that a plan of operations for exploration shall be filed within three years of the issuance of a lease. The diligence requirements shall also provide that drilling shall commence no later than two years after approval of such plan or two years after a drilling permit has been approved, whichever is later. The Secretary may provide for the aggregation of diligence requirements on lease tracts within a geothermal prospect. The running time of the diligence requirements established in this subsection shall be suspended for periods of unreasonable delay caused by a lessee's inability to obtain State or Federal permits (with the exception of permits issued by the Department of the Interior) through no fault of his own.".

Sec. 122. Sections 25, 26, and 27 of the Act are amended by deleting therefrom the words "steam and associated geothermal" in each instance in which they appear.

Sec. 123. Section 5(a) of the Act is amended by—

(i) adding after the words "per centum" the first time they appear the following: "(or, in the case of nonelectric uses, 5 per centum)"; and

(ii) adding at the end thereof the following: "The Secretary may defer royalty payments for nonelectric geothermal developments when it is deemed to be in the public interest, for municipal, cooperative, or other political subdivision lessees where legal limitations on front-end financing otherwise would prohibit or significantly deter development.".

Sec. 124. Section 15 of the Act is amended by adding a new subsection (f) to read as follows:

"(f)(1) With respect to lands within national parks or monuments, the Secretary shall identify within one hundred and eighty days after enactment of the Geothermal Steam Act Amendments of 1980, and publish in the Federal Register, a list of nationally significant thermal features located on such lands, and shall periodically update such list to include newly emergent or newly discovered nationally significant thermal features, thermal features which gain national significance through changes in patterns of their use or of their perceived scientific importance, and nationally significant thermal features of new national parks or monuments. The Secretary's determination shall be by formal rulemaking with a complete description of such feature and a full justification for its designation. The Secretary shall submit his determinations to the Congress. The Secretary will in such publication describe geographic zones outside the boundaries of national parks and monuments where development of geothermal resources may affect nationally significant thermal features, based on review of presently available data or reasonable inferences therefrom, and may, from time to time, amend the boundaries of such zones in conformity to newly available data. Any designation pursuant to this section may be reviewed, modified, and revoked upon the determination that new information or circumstances support such action. For the purpose of this subsection, the term "nationally significant thermal feature" means a natural surface manifestation of geothermal activity or a complex of such manifestations, which is a feature the park unit involved was intended in its establishment to protect, or which has since been recognized as a park resource of national significance.

"(2) The Secretary may issue geothermal leases on Federal lands within geographic zones described pursuant to paragraph (1) only upon review of the best geological, hydrological, and other relevant evidence reasonably obtainable and only upon his determination that exploration activities pursuant to a geothermal lease on such Federal lands will not have a foreseeably significant adverse effect on nationally significant geothermal features. The Secretary may further impose conditions and stipulations in such leases necessary to limit activities to those which will not so affect nationally significant thermal features. Any lease in effect within the geographic zone established pursuant to a designation of a nationally significant thermal feature pursuant to (1) above as of the date of the determination by the Secretary of such designation shall be exempt from the application of this subsection.

"(3) Subject to valid existing loans, grants, and licenses, a department or agency of the United States shall not grant or issue a loan, grant, or license required for the exploration or development of geothermal resources within the geographic zones identified, or on non-Federal lands within national park or monument boundaries, unless the department or agency, following consultation with the Secretary of the Interior, determines, in accordance with the standards, provisions, limitations, and authorities applied above to geothermal leases on Federal lands, that activities so assisted would not have a foreseeably significant adverse effect on nationally significant thermal features.

"(4) Prior to the issuance of any geothermal leases in a zone defined in this subsection adjacent to Yellowstone National Park, Mount Rainier National Park, or Lassen Volcanic National Park, the Secretary of the Interior shall determine that (1) a valuable geothermal resource exists and (2) development of the potential geothermal resource will not adversely affect the unique thermal features of these parks.".

SEC. 125. The Act is further amended by addition of new section 28, as follows:

"SEC. 28. The Secretary shall immediately implement the following new leasing and operating procedures, which shall be effective upon enactment of the Geothermal Steam Act Amendments of 1980.

"(a) Lease application information shall indicate clearly and concisely all requirements for information and action by the applicant necessary for timely processing of the application, the responsible officials with their respective responsibilities and contact information, the specific steps in the process, the time frames for such steps, and any options or appeals available to the applicant, among any other relevant information. To the maximum extent feasible, all requirements for information and action by the applicant, such as the geothermal resources exploration bond form and such bonding, shall be uniform among the several departments.

"(b) Any lease application or permit application already filed and pending on the date of enactment of the Geothermal Steam Act Amendments of 1980 shall be subject to the time frames established in this Act, as if the filing date of such applications occurred on the date of enactment of the Geothermal Steam Act Amendments of 1980: *Provided, however,* That this subsection shall not be used to delay any earlier processing of such applications, and all such pending applications shall receive the highest priority in the implementation of this section.

"(c) The Secretary shall, in the preparation of any environmental assessment or environmental impact statement required by the National Environmental Policy Act for any action under this Act, to the maximum extent feasible, utilize any relevant information contained in an applicable and available land management plan developed pursuant to the Federal Land Policy and Management Act or in an applicable and available forest management plan pursuant to the National Forest Management Act. This subsection shall not be construed as a requirement to delay any environmental assessment, or consideration of such an assessment, otherwise complete in the opinion of the Secretary, to include or consider additional information contained in any such land management plan or such forest management plan, or under development of such a plan.".

SEC. 126. Section 4 of the Act is amended by inserting the following before the word "Notwithstanding":

"(h) A reasonable number of leasing tracts, not to exceed 10 per centum of the acreage leased in any year, shall be offered on the basis of a specific application for such tract in accordance with this section to public bodies, including rural electric cooperatives, or nonprofit corporations controlled by and predominantly made up of any of such entities: *Provided,* That the geothermal resource so offered for lease shall be predominantly for use by such entity or entities in implementing a definite plan to produce energy for their own use or for sale to their members or customers (except for short-term sales to others). In carrying out the provisions of this subsection, the Secretary shall not consider expressions of interest by public bodies in lands after (i) in the case of lands not within a known geothermal resources area, the thirty-day filing period for a tract has expired and there is a valid pending noncompetitive lease application, or (ii) in the case of lands within a known geothermal resources area, thirty days prior to the offering of a tract for lease.".

SEC. 127. The Act is amended by inserting after section 10 the following new section:

"SEC. 10A. (a) Notwithstanding any provision of the Department of Energy Organization Act (42 U.S.C. 7101 et seq.), the Secretary, immediately upon the enactment of the Geothermal Resources Act Amendments of 1980, shall promulgate regulations that will ensure prompt reoffering of all relinquished, abandoned, and expired geothermal leaseholds.

"(b) Upon a determination by the Secretary that a geothermal leasehold or any part thereof is abandoned, relinquished, or expired, such lands as are described in the lease, or the part thereof subject to such a determination, shall become lands subject to geothermal leasing as described in section 4.

"(c) The provisions of this section are in addition to and not in lieu of the provisions of sections 10 and 24.".

SEC. 128. The Secretary shall prescribe such rules and regulations, or amendments to existing rules and regulations, as may be necessary to reflect the amendments made by the Geothermal Steam Act Amendments of 1980 within one hundred and eighty days after the date of enactment of the Geothermal Steam Act Amendments of 1980.

SEC. 129. Section 18 of the Act is amended by adding at the end thereof the following: "Once a lease enters a unit, the diligence requirements of this Act for that lease shall be satisfied by compliance with diligence requirements on any lease within the unit as long as the lease remains within the unit. This does not affect the Secretary's authority to require compliance with an approved exploration or development plan for a unit.".

II

97TH CONGRESS
1ST SESSION

S. 1516

To amend the Geothermal Steam Act of 1970 (30 U.S.C. 1001 et seq.) to expedite exploration and development of geothermal resources.

IN THE SENATE OF THE UNITED STATES

JULY 23 (legislative day, JULY 8), 1981

Mr. WARNER (for himself and Mr. MCCLURE) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

---

A BILL

To amend the Geothermal Steam Act of 1970 (30 U.S.C. 1001 et seq.) to expedite exploration and development of geothermal resources.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Geothermal Steam Act of 1970 (30 U.S.C. 1001 et seq.) is amended as follows:

SECTION 1. This Act may be cited as the "Geothermal Steam Act of 1981".

SEC. 2. Whenever an amendment or repeal contained in this Act is expressed in terms of amendment to, or repeal of, a section or other provision of "the Act," such reference shall be considered a reference to an amendment to, or repeal of, a section or other provision of the Geothermal Steam Act of 1970 (30 U.S.C. 1001 et seq.; Public Law 91-581).

SEC. 3. Section 3(2) of the Act is amended to read as follows: "(2) in any lands administered by another Federal agency or department, including public, withdrawn, or acquired lands.".

SEC. 4. Section 2(e) of the Act is amended to read as follows:

"(e) 'known geothermal resource area' means an area in which there is substantial physical evidence including but not limited to the geology or a discovery on such lands, which would, in the opinion of the Secretary, engender a belief in persons experienced in the subject matter that the prospects for extraction of geothermal resources for the primary purpose of generating electricity in commercial quantities warrant substantial expenditures for that purpose.".

SEC. 5. Section 4 of the Act is amended—

(a) by deleting the first two sentences, and inserting in lieu thereof the following:

"SEC. 4. (a) If lands to be leased under this Act are within any known geothermal resource area, they shall be leased to the highest responsible qualified bidder by competitive bidding. Any lands so offered and receiving no bids shall be declassified and leased to the first qualified applicant: *Provided,* That the Secretary's authority to reclassify such lands as a known geothermal resource area at a later date on the basis of new evidence shall not be affected.

"(b) If the lands to be leased are not within any known geothermal resource area, the qualified person first making application for the lease shall be entitled to a lease of such lands without competitive bidding, provided the lands applied for are not designated a known geothermal resource area within one year of the application being filed and before a lease is issued. If an application is rejected due to a known geothermal resource area designation of the lands within one year of the application being filed, the applicant shall have the opportunity to match the highest competitive bid for the parcel when offered, provided the applicant submits a bona fide bid at the sale. However, the applicant or lessee responsible for the exploration resulting in the designation of lands as a known geothermal resource area shall be entitled to noncompetitive leases for all lands in the known geothermal resource area for which the applicant or lessee had first filing applications on file prior to the approval of any plan of exploration or notice of intent to conduct geophysical exploration.";

(b) by inserting "(c)" before the word "Notwithstanding" at the beginning of the next sentence; and

(c) by redesignating subsections "(a)" through "(f)" as paragraphs "(1)" through "(6)".

SEC. 6. Section 5(a) of the Act is amended to read as follows:

"(a) a royalty of not less than 10 per centum or more than 15 per centum in the case of electrical generation, or of not less than 5 per centum or more than 10 per centum in the case of nonelectrical utilization, of the amount or value, as utilized, of steam, heat, or other form of energy derived from production under the lease and sold or utilized by the lessee or reasonably susceptible to sale or utilization by the lessee.".

SEC. 7. Section 6(d) of the Act is amended to read as follows:

"(d) For purposes of subsection (a) of this section, production or utilization of geothermal resources in commercial quantities shall be deemed to include the completion of one or more producing or producible wells and either a bona fide sale for delivery to a facility or facilities installed or to be installed not later than fifteen years from the commencement date of the lease, or in the case of utilization by the lessee, proof of commitment to construct such utilization facilities. However, in the event construction of the facility or facilities has not been possible due to administrative delays beyond the control of the lessee or due to the demonstrated marginal economics of such a facility or facilities, and substantial investment in development of the lease has been made, the Secretary will consider an additional extension of the extended primary lease term of up to 10 years: *Provided,* That the lessee be required to submit annual reports detailing bona fide efforts to resolve the administrative delays or to bring the facility or facilities into economic production.".

SEC. 8. Section 7 of the Act is amended to read as follows:

"SEC. 7. (a) A geothermal lease shall embrace a reasonably compact area of not more than two thousand five hundred and sixty acres, except where a departure therefrom is occasioned by an irregular subdivision or subdivisions. No person, association, or corporation, except as otherwise provided in this Act, shall take, hold, own, or control at any one time, any direct or indirect interest in Federal geothermal leases in any one State exceeding fifty-one thousand two hundred acres.

"(b) At any time after fifteen years from the effective date of the Geothermal Steam Act of 1970, the Secretary, after public hearings, may increase this maximum holding in any one State by regulation, not to exceed one hundred fifteen thousand two hundred acres.

"(c) Any leases which contain a well shown to be capable of commercial production and any lease operated under an approved operating, drilling, or development contract as authorized under section 18 of this Act shall be excepted in determining holdings or control under this section.".

SEC. 9. Section 8(a) of the Act is amended to read as follows:

"SEC. 8. (a) The Secretary may adjust the terms and conditions, except as otherwise provided herein, of any geothermal lease issued under this Act at not less than twenty-year intervals beginning twenty years after the date production is commenced, as determined by the Secretary. Each geothermal lease issued under this Act shall provide for such readjustment. The Secretary shall give notification of any proposed readjustment of terms and conditions, and, unless the lessee files with the Secretary objection to the proposed terms or relinquishes the lease within thirty days after receipt of such notice, the lessee shall conclusively be deemed to have agreed with such terms and conditions. If the lessee files objections, and no agreement can be reached between the Secretary and the lessee within a period of not less than sixty days, the lease may be relinquished by the lessee, or following appropriate judicial proceedings, canceled by the Secretary.".

SEC. 10. Section 15(b) of the Act is amended to read as follows:

"(b) The Secretary shall consult with the head of any other Federal agency or department with respect to lands under its jurisdiction to determine appropriate terms or conditions prior to issuing leases for such lands. However, as to acquired lands of other Federal agencies or departments, the Secretary shall not issue leases on those lands without the consent of the head of that agency or department. The head of the Federal agency or department which administers any land which is subject to a geothermal lease or which is available for geothermal leasing, shall, in making land use decisions regarding such land or adjacent lands, consider their potential for geothermal resource development.".

SEC. 11. Section 23 of the Act is amended by adding after subsection (b) the following:

"(c) Where the Secretary finds it in the public interest, the Secretary is authorized, subject to section 15(c), to issue permits for the use of geothermal resources in lands administered by him for any noncommercial application without requiring a lease or compensation therefor. No such free use permit may be issued for the purpose of generating electricity in any amount.

"(d) In any case in which the Federal interest in any geothermal energy research and development facility, pilot plant, or demonstration facility which utilizes geothermal resources from lands subject to the provisions of this Act is transferred to any person, corporation, municipality, or agency, the Secretary is authorized, notwithstanding any other provision of this Act, to issue at no cost, a permit allowing necessary surface use and utilization of geothermal resources sufficient, in the Secretary's opinion, for the continued operation of such plant or facility for the operating life of the project.

"(e) The head of each Federal agency may develop for the use or benefit of such agency any geothermal energy resource within lands under its jurisdiction. The head of such agency shall determine in writing, with the concurrence of the Department of the Interior, that such utilization is in the public interest, and will not deter commercial development which might otherwise be more beneficial to the public if the lands were offered for leasing under this Act.".

SEC. 12. The Act is further amended by making the following technical changes:

(a) Section 2(c) of the Act is amended by striking out "steam and associated geothermal" and by inserting after "brines" in the first place it appears, the following: "geopressured water, magma, and hot rock formations".

(b) Section 2(d) of the Act is amended by striking out "steam" in both places it appears and inserting in lieu thereof "resources".

(c) Section 3 of the Act is amended by striking out "steam and associated geothermal" in both places it appears.

(d) Section 5(d) of the Act is amended by striking out "steam and byproduct" and inserting in lieu thereof "resources".

(e) Section 6(a) of the Act is amended by striking out "steam is" in both places it appears and inserting in lieu thereof "resources are".

(f) Section 6(b) of the Act is amended by striking out "steam is" and inserting in lieu thereof "geothermal resources are".

(g) Section 6(c) of the Act is amended by striking out "steam is" in the first place it appears and inserting in lieu thereof "resources are," and by striking out "steam is" in the second place it appears and inserting in lieu thereof "geothermal resources are".

(h) Sections 6 (d) and (e) of the Act are amended by striking out "steam" in each place it appears and inserting in lieu thereof "resources".

(i) Section 6(f) of the Act is amended by striking out "steam and associated goethermal".

(j) Section 8 of the Act is amended by striking out "steam is" in both places it appears and inserting in lieu thereof "resources are".

(k) Section 9 of the Act is amended by striking out "steam" and inserting in lieu thereof "resources".

(l) Section 19 of the Act is amended by striking out "steam" and inserting in lieu thereof "resources".

(m) Section 23 of the Act is amended by striking out "steam and associated geothermal" in both places it appears.

(n) Section 25 of the Act is amended by striking out "steam and associated geothermal".

(o) Section 26 of the Act is amended by striking out "steam and associated geothermal".

(p) Section 27 of the Act is amended by striking out "steam and associated geothermal" in the three places it appears.

SEC. 13. A new section is added to the Act as follows:

"(a) The Secretary may issue leases and allow exploration and testing activities on lands subject to wilderness study under section 603 of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1782), and on lands within the national forest system which have been identified by the President for further land use planning. Such exploration and testing activities shall be deemed not to impair the suitability of the lands involved for inclusion in the National Wilderness

Preservation System. The Secretary shall include in any lease issued, stipulations to ensure that exploration and testing activities will not permanently impair the wilderness values of the lands subject to such activities.

"(b) For purposes of section 4(d)(3) of the Wilderness Act of 1964 (16 U.S.C. 1131 et seq.), this Act, as amended, shall be deemed a law pertaining to mineral leasing.".

Senator WARNER. Senator Wallop.

STATEMENT OF HON. MALCOLM WALLOP, A U.S. SENATOR FROM THE STATE OF WYOMING

Senator WALLOP. Thank you very much, Mr. Chairman, and let me say that I appreciate this opportunity to lead such an investigation on behalf of the committee.

Since the early 1970's when geothermal leasing interest in Federal lands was first expressed in eastern Idaho, and I might add on the scale of 200 Federal lease applications, the Congress and the executive branch have been concerned about providing responsible protective measures for the unique geothermal features of Yellowstone National Park. Unfortunately, today we are not much further down the road to resolving this concern than we were back in 1975 when the Department of the Interior and the Department of Agriculture decided that the issue merited an environmental impact statement.

I trust, however, that my Subcommittee on Public Lands and Reserved Water with the help of this subcommittee and the Interior Department will build a record upon which an acceptable solution can be reached. I intend to ferret out all alternatives, both legislative and administrative, and my intended field hearing will be expedited, the details of which are presently being worked out. In this vein, I look forward to working with the Department of the Interior, and thank Secretary Watt for his gracious letter of October 26, offering his assistance with this effort, and if I may, Mr. Chairman, I would like to insert that letter in this part of the record.

Senator WARNER. So ordered.

[The letter follows:]

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

OCT [illegible] 1981

The Honorable Malcolm Wallop
United States Senate
Washington, D.C. 20510

Dear Senator Wallop:

Facilitating the timely and orderly development of America's abundant geothermal resources, while exercising special precautions near National Parks to protect significant thermal features, is an objective we all share. Toward that end I am pleased to learn that you and Senators Warner and McClure have reached agreement in principle to establish special statutory protections for the nationally significant thermal features of Yellowstone National Park.

Crafting appropriate protective language, we can attest, is a difficult matter involving a balance between assurance of protections to national treasures such as Old Faithful and care not to unduly restrict the search for valuable, publicly owned geothermal resources.

We stand ready to assist you with technical resources or other advice and counsel necessary to refine your approach to protecting the nationally significant thermal features of Yellowstone.

Warm regards.

Sincerely,

SECRETARY

Senator **Wallop**. On the broader subject of today's hearing I wish to add my voice to those in support of S. 1516. I fully share Chairman McClure's and Chairman Warner's enthusiasm for the bill. As I am sure today's testimony will point out, there are several aspects of the Geothermal Steam Act of 1970 which literally scream for revision. Of great importance I think is the 1970 law's acreage limitation which has proven inadequate long before its Secretarial revisable date of 1985.

In view of Interior's recently expedited leasing program many companies have been placed in the uncanny position of having to relinquish leases to gamble on new ones. It clearly is high time that Interior effectuated its geothermal leasing authority, and I commend the Secretary on his initiative, but it is equally time for us to eliminate the roadblocks and to provide necessary incentives to facilitate accelerated exploration and development of geothermal resources on Federal lands.

Regardless of the fact that the first commercial use of geothermal resources dates back to 1777 and the first power-generating station established in 1904, both in Larderello, Italy, commercial development of the resource in this country did not begin until 1955, and in spite of the good intentions of the Geothermal Steam Act of 1970, commercial development of the Federal lands has nonetheless been nonexistent.

The U.S. Geological Survey has estimated that as much as 95 million acres of land, mostly in the West and including Alaska and Hawaii, have potential for geothermal development. Some 60 percent of those geothermal resources occur on federally owned land. Considering our energy dilemma and the need to develop alternative domestic energy resources, our inaction for the past decade is a sad commentary, a commentary which S. 1516 intends to change.

I thank you very much, Mr. Chairman, for your cooperation, and I am certain that with the cooperation of the Secretary of the Interior and the Geological Survey, we can find the means by which the country's mind can be set to rest on those very critical features.

Senator **Warner**. I certainly hope that we can initiate a geothermal bill with appropriate environmental protection. I think geothermal energy is rather an exciting subject. It is one that I am a learner in. I studied extensively last night the statements submitted thus far, and I am anxious to hear the witnesses today.

Before doing so, though, the record will reflect in its entirety my opening statement and anything further that Senators Wallop or McClure may wish to enter, and I also have here a statement by Senator Jackson. He is deeply concerned, as we all are, about the protection of the national parks, and his remarks mentioned here should be carefully considered.

[The prepared statement of Senator Jackson follows:]

OPENING STATEMENT BY SENATOR HENRY M. JACKSON

HEARING ON S.669 AND S.1516,
to amend the Geothermal Steam Act of 1970

Mr. Chairman, I am pleased that this Subcommittee is holding hearings on legislation regarding the leasing of geothermal steam resources located on federal lands. Development of this significant energy resource is long overdue.

In 1970 Congress enacted the Geothermal Steam Act to establish a system of leasing geothermal resources on federal lands, where an estimated 60 percent of the U.S. geothermal potential is located. The intent of the Act was to encourage commercial development. However, for a variety of reasons, including some of the limitations included in the Act, very little commercial development has thus far occurred.

Last year this Committee reported, and the Senate passed, S.1388, which would have modified those provisions of the 1970 Act that were impeding commercial development. The two bills being considered today -- S.669, which I introduced, and S.1516, which Senator Warner introduced -- address many of these same impediments.

I would like to take a moment to point out two features of my bill that are not included in S.1516. First, my bill attempts to assist local governmental entities in meeting their pressing energy needs by providing a set-aside of up to 10 percent of the acreage leased each year, and by allowing the Secretary of the Interior to defer royalty payments under appropriate circumstances. Second, my bill adopts the provisions in last year's bill requiring the Secretary to take specific steps that would adequately protect geothermal features of national significance located within our National Parks and monuments. Development of our geothermal resources should not, and need not, harm the important geothermal features that enhance our National Parks and monuments.

I look forward to hearing testimony today on both of these bills. I am confident that we can work together toward a bill that will overcome past difficulties and will provide a sound basis for future development of this valuable resource.

Senator **Warner**. Senator McClure.

STATEMENT OF HON. JAMES A. McCLURE, A U.S. SENATOR FROM THE STATE OF IDAHO

The **Chairman**. Thank you very much, Senator Warner, and I do appreciate your taking the time to schedule and hold this hearing, and I would be here for the entire hearing but as you know the Interior appropriations bill is on the floor starting in just a few minutes. I have to be there.

I have a statement I would like to have placed in the record.

Senator **Warner**. So ordered.

The **Chairman**. I want to highlight just one portion of that because I think it is to me the most difficult issue which we have to resolve, and that is the question of the relationship of Federal geothermal leasing in the vicinity of so-called nationally significant thermal features in a few of our national parks, most particularly, of course, Old Faithful in Yellowstone, but there are a host of other geothermal features in Yellowstone National Park, not just Old Faithful.

I argued then and I am still basically convinced now that existing statutory authority if prudently and responsibly administered and where necessary coupled with supporting action can provide the necessary protection for Old Faithful.

Candidly, the House- and Senate-passed bills took the contrary view and included, in my judgment, highly restrictive and unnecessary special statutory protection. Certainly the Senate bill fashioned by this committee was much more responsible legislation in attempting to strike a balance among the competing rights and interests, but I still would have preferred much less restrictive provisions if any at all.

I want to underscore the fact that the geothermal features in national parks are going to be protected. There isn't anyone that I know that doesn't support that, and I think it would be highly irresponsible if as a matter of fact they did not.

I think the commitment that has been made by the Senator from Wyoming and certainly by the Senator from Idaho underscores that fact. There will be protection for those features, but that protection must be a reasonable and balanced one that is administratively possible to implement, and I hope that as we proceed we will be able to find that balance. I believe it can be struck. We will guarantee those kinds of protection for those thermal features, and at the same time make it possible for us to develop the resources where there is no damage to thermal features within the national park.

Thank you.

[The prepared statement of Senator McClure follows:]

SENATOR MCCLURE'S STATEMENT
FOR HEARING ON OCTOBER 27, 1981
ON S.1516 AND S.669

Good morning, ladies and gentlemen. Today's hearing on S.1516 and S.669 focuses the attention of the Committee on a number of long pending issues in the area of Federal geothermal leasing. I am particularly pleased that we are moving ahead now on those issues and I want to commend Senator Warner, the Subcommittee Chairman, for introducing S.1516 and scheduling this hearing.

Many of those present today may recall that on June 13, 1979, I introduced the first proposal ever in the Congress for omnibus geothermal development legislation. That legislation, S.1330, 96th Congress, included proposals in a number of areas to support geothermal development, including reform of geothermal leasing under the Geothermal Steam Act of 1970. Most of the non-leasing proposals in that bill were enacted in one form or another in the Energy Security Act of 1980 and in separate tax legislation.

The leasing reform proposals were considered and separately legislated by this Committee in another bill reported in May, 1980, and passed by the Senate on June 24, 1980. A large number of the concepts included in my original bill and later in this Committee's bill were drawn from the Carter Administration's interagency Geothermal Streamlining Task Force, which reported finally in January of 1980. The Task Force report was the first comprehensive attempt at reforming the Geothermal Steam Act and we considered it carefully in our efforts in the Committee. The House also passed companion geothermal leasing reform legislation in the last Congress. Unfortunately, we were unable to fashion a final compromise in informal negotiations with the House Interior and Insular Affairs Committee, before the end of the last Congress.

After continued discussions this year with the new Administration and interested Members of the House of Representatives, Senator Warner on July 23rd introduced S.1516, the Geothermal Steam Act of 1980, which I was pleased to co-sponsor. Similar legislation has been introduced in the House and already been the subject of subcommittee hearings. Generally, the bill includes many of the concepts in the Senate and House bills from last year. I should also note that Senator Jackson's bill, S.669, introduced in March, includes many of the same concepts from last year, thus giving us again a bipartisan basis for legislating on the issue.

S.1516 would reform the definition of Known Geothermal Resources Area (KGRA) to clarify the competitive interest test, and rationalize better the competitive and non-competitive leasing procedures dependent on the KGRA definition. The bill provides an important recognition for the first time of the distinctions between electric and non-electric use of our geothermal resources, in the area of royalties and certain leasing procedures. The bill also increases the existing acreage limitation, which has become an impediment for some developers, to the higher limit of 51,200 acres passed by the Senate and House last year. Finally, the bill reforms a series of provisions in existing law to reflect the experience of a decade under the original Geothermal Steam Act.

One of the issues that was most difficult for this Senator, and indeed this Committee, in the last Congress was the question of the relationship of Federal geothermal leasing in the vicinity of "so-called" nationally significant thermal features in a few of our National Parks, most particularly Old Faithful at Yellowstone. I argued then, and I am still basically convinced now, that existing statutory authority--if prudently and responsibily administered--and, where necessary, coupled with supporting action, can provide the necessary protection for Old Faithful. Candidly, the House-

AND SENATE-PASSED BILLS TOOK A CONTRARY VIEW AND INCLUDED IN MY JUDGEMENT HIGHLY RESTRICTIVE AND UNNECESSARY, SPECIAL STATUTORY PROTECTION. CERTAINLY, THE SENATE BILL FASHIONED BY THIS COMMITTEE WAS MUCH MORE RESPONSIBLE LEGISLATION IN ATTEMPTING TO STRIKE A BALANCE AMONG THE COMPETING RIGHTS AND INTERESTS, BUT I STILL WOULD HAVE PREFERRED MUCH LESS RESTRICTIVE PROVISIONS, IF ANY AT ALL.

S.1516 DOES NOT INCLUDE ANY SPECIAL STATUTORY PROVISIONS FOR OLD FAITHFUL OR ANY BROADER CLASS OF THE SO-CALLED NATIONALLY SIGNIFICANT THERMAL FEATURES IN THE NATIONAL PARKS. IT CONFORMS THEREFORE, TO MY EXPRESSED PREFERENCE FOR DEPENDING ON EXISTING LAW. I KNOW THAT FACT HAS TROUBLED SOME OF MY COLLEAGUES, PARTICULARLY SENATOR WALLOP OF WYOMING, WHO HAS THE IMPORTANT REPRESENTATIONAL RESPONSIBILITY TO PROTECT OLD FAITHFUL AND YELLOWSTONE. I MUST SAY FOR THE RECORD THAT ALL OF US ON THIS COMMITTEE, I AM SURE, SUPPORT MALCOLM WALLOP IN DISCHARGING TO THE BEST OF HIS (AND OUR) ABILITIES THAT RESPONSIBILITY. AT SENATOR WALLOP'S INITIATION, HE, SUBCOMMITTEE CHAIRMAN WARNER AND I HAVE BEEN REVIEWING OUR APPROACH TO THIS ISSUE, IN CLOSE CONSULTATION WITH SECRETARY OF THE INTERIOR WATT, OVER THE PAST SEVERAL WEEKS.

I AM PLEASED TO ANNOUNCE TODAY, AS WE BEGIN THESE HEARINGS, THAT SENATOR WALLOP, SENATOR WARNER AND I, WITH SUPPORT FROM SECRETARY WATT, HAVE REACHED THE FOLLOWING AGREEMENT. FIRST, WE HAVE AGREED IN PRINCIPLE THAT ANY GEOTHERMAL LEASING REFORM LEGISLATION REPORTED BY THIS COMMITTEE WILL INCLUDE AN ACCEPTABLE RESOLUTION OF THIS ISSUE WHICH, IN OUR JUDGEMENT, ADEQUATELY PROTECTS THE NATIONALLY SIGNIFICANT THERMAL FEATURES OF YELLOWSTONE NATIONAL PARK. SECOND, WE HAVE AGREED THAT SUCH RESOLUTION REQUIRES ADDITIONAL INVESTIGATION AND RESEARCH OF ALL RELEVANT INFORMATION REGARDING THE RELATIONSHIP BETWEEN GEOTHERMAL DEVELOPMENT AND YELLOWSTONE. AND, TO THAT END, THIRDLY, SENATOR WALLOP AND HIS SUBCOMMITTEE ON PUBLIC LANDS AND RESERVED WATER WILL BE ASSIGNED

RESPONSIBILITY TO CONDUCT THAT INVESTIGATION AND RESEARCH IN A TIMELY FASHION, INCLUDING SCHEDULING A FIELD HEARING IN THE YELLOWSTONE AREA AT THE EARLIEST CONVENIENT TIME, AND MAKING RECOMMENDATIONS TO THE COMMITTEE ON MEASURES TO PROVIDE THE ADEQUATE PROTECTION FOR YELLOWSTONE. THE COMMITTEE HAS RECEIVED BY LETTER OF OCTOBER 26, 1981, A COMMITMENT FROM SECRETARY WATT TO ASSIST THIS EFFORT WITH TECHNICAL RESOURCES OR OTHER ADVICE AND COUNSEL IN THIS EFFORT, AND THE SUBCOMMITTEE WILL UTILIZE THIS ASSISTANCE TO COMPLETE ITS ASSIGNMENT. I AM SURE ALSO THAT WE WILL HAVE THE SUPPORT OF SENATOR JACKSON, SENATOR BUMPERS, SENATOR MELCHER AND OTHERS WHO HAVE WORKED ON THIS ISSUE IN THE PAST IN DEVELOPING A BIPARTISAN APPROACH. ALL OF THIS, WE ARE CONVINCED, CAN BE COMPLETED ON A TIMELY BASIS TO SUPPORT CONTINUED PROGRESS ON THIS IMPORTANT LEGISLATION.

I WANT TO COMMEND SENATOR WALLOP FOR HIS FINE LEADERSHIP ON THIS ISSUE AND THANK SENATOR WARNER FOR HIS GREAT PATIENCE AND STATESMANLIKE CHAIRMANSHIP IN FASHIONING THIS MOST RESPONSIBLE APPROACH TO A TOUGH ISSUE. AS JIM WATT SAID SO ARTICULATELY IN HIS LETTER OF YESTERDAY, "CRAFTING APPROPRIATE PROTECTIVE LANGUAGE, WE CAN ATTEST, IS A DIFFICULT MATTER INVOLVING A BALANCE BETWEEN ASSURANCE OF PROTECTIONS TO NATIONAL TREASURES SUCH AS OLD FAITHFUL AND CARE NOT TO UNDULY RESTRICT THE SEARCH FOR VALUABLE, PUBLICLY-OWNED GEOTHERMAL RESOURCES." I AM CONVINCED THIS AGREEMENT WILL PROVIDE THE APPROACH NECESSARY TO FASHION JUST SUCH A DELICATE BALANCE.

FINALLY, MR. CHAIRMAN, I BELIEVE WE MUST NOT LOSE SIGHT OF THE CONTINUING POTENTIAL ENERGY SUPPLY CONTRIBUTION WHICH THIS NATION'S GEOTHERMAL RESOURCES ON FEDERAL LANDS REPRESENT. THIS COMMITTEE HAS CHAMPIONED GEOTHERMAL DEVELOPMENT GENERALLY OVER THE PAST FIVE YEARS. WE CANNOT STOP NOW, WHEN GEOTHERMAL RESOURCES STILL OFFER AN ATTRACTIVE ECONOMIC AND ENERGY SECURITY ALTERNATIVE TO IMPORTED OIL AND GAS, PARTICULARLY ON FEDERAL LANDS IN OUR WESTERN STATES. THIS BILL WILL PROVIDE THE SUPPORT NECESSARY TO ENSURE THAT THOSE GEOTHERMAL RESOURCES ARE DEVELOPED AND AVAILABLE IN THE DECADES AHEAD. THANK YOU.

Senator **Warner**. Thank you, Mr. Chairman. We will now hear from our first witness who has been very patient in listening to his colleagues on the Senate side of the Congress.

We have the Honorable Don Clausen, a Member of the House of Representatives from the State of California. Congressman, we thank you for joining us.

STATEMENT OF HON. DON H. CLAUSEN, A U.S. REPRESENTATIVE FROM THE STATE OF CALIFORNIA

Mr. **Clausen**. Mr. Chairman and members of the committee, I appreciate the fact that you and the leadership of this committee are in fact moving with dispatch on this legislation.

As you know, I am on the counterpart committee on the House side on the Interior, and we are attempting to address that. Hopefully we will be able to track with that which you are attempting to advance here legislatively.

I appreciate the opportunity to testify in support of S. 516 by you, Mr. Chairman, and our distinguished chairman of the full committee, Senator McClure. I am a cosponsor of H.R. 4067 which is a similar bill in the House, and I strongly support your continued efforts to advance a legislative proposal which will enhance our development of geothermal energy.

The time has come for us to remove the roadblocks which exist and provide the incentives to advance the development of this relatively untapped energy resource.

Now, Mr. Chairman, I would ask unanimous consent if I could to place my full statement into the record, and I will summarize.

Senator **Warner**. Without objection—just one technical correction. You refer to the bill as S. 516. It is S. 1516 on the Senate side.

Mr. **Clausen**. S. 1516—I'm sorry; thank you, and I would also like to extend to you, Mr. Chairman, an invitation to come to my congressional district there in northern California. We had our former President Ford out there to see in place the first geothermal energy development in the United States, and it is very successful, and as you know, it is the largest producing geothermal area, and the first of its kind which is located in northern California, but the core of the Geysers is privately owned land being developed primarily by the utility organization known as Pacific Gas & Electric, but presently there are 14 units generating some 798 megawatts of electricity.

The extent of the resource is still unknown, but many observers of the Geyser development now are in agreement that the resource has the potential to support a generating capacity of 2,500 megawatts, the equivalent of more than 2 million barrels of oil per year, but here is my problem.

Adjacent to the area are lands which are homesteaded under the 1916 Stockraising Homestead Act. The surface was transferred to private ownership, but the subsurface mineral rights were reserved by the Federal Government. A conflict has arisen as a result of the 1977 Ninth Circuit Court decision declaring that for purposes of the Stockraising Homestead Act, mineral reservation that geothermal resources were reserved to the Government.

Up until this court decision, and I think this is a very important point, the landowners had acted in good faith reliance on correspondence from an earlier Interior Department Solicitor assuring them that geothermal resources are simply water, and one would expect that—steam, water—and as such are not considered to be minerals under the mineral leasing laws. Many of the lands have remained in the same families as those who first homesteaded it. Others have been purchased by persons believing they had the right to develop the geothermal steam.

The situation is compounded by problems arising from previous administrative actions pertaining to the actual lease agreements as well as bonding procedures. Now our own House subcommittee, chaired by Jim Santini, went to the area to hear the witnesses, but two significant decisions were made by BLM.

First, in December 1979, the Bureau issued an instruction memorandum to field managers to insure that the protection bonds which must be presented by the lessee, are adequate to protect the surface owners from, "all reasonable direct damage" that may result to their property on the leaseholds as a result of action taken pursuant to geothermal leasing.

In July 1980, the Department issued a Solicitor's opinion which stated that neither the United States nor a lessee had the reserved right under the Stockraising Homestead Act to utilize geothermal resources on stockraising land without obtaining the consent of the landowner. In other words, a lessee may not site a powerplant on a lease without the permission of the landowner.

This decision is highly significant as it should enable surface owners to negotiate a compensation agreement with the lessees.

Now in order to correct what I think is a comparatively minor problem, and I want to share with you that I want to confine it, I want to confine it to this area because I think it is unique, it is my intention to pursue with you as well as on the House side an amendment to the legislation that is similar to legislation enacted by the State of California Legislature and signed by the then Gov. Ronald Reagan.

My amendment would be limited to the Geysers area where this unique situation exists. A similar provision currently exists with regard to State lands where the surface is privately owned and minerals were reserved. It has been in effect since 1967 and has occurred in four of eight tracts leased in Geysers by competitive bidding, and I will share with you this amendment and make it part of the record, but I believe that a similar system can work equally well on the Federal lands, but again I repeat while that particular legislation in California applies to all of California State lands, my objective is to confine this amendment just to this Geysers area.

I do appreciate the attention that you have given to this problem, and I believe it imperative that you arrive at a fair and responsible solution so that we may proceed with the development of geothermal resources in those areas.

It is my desire, always has been, to expedite the use of this very valuable, and it is a very clean energy resource, while assuring the reasonable protection to the landowners' rights.

Mr. Chairman, thank you very much.

[The prepared statement of Congressman Clausen follows:]

STATEMENT OF CONGRESSMAN DON H. CLAUSEN
BEFORE SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES
SENATE ENERGY AND NATURAL RESOURCES COMMITTEE
OCTOBER 27, 1981

MR. CHAIRMAN. I APPRECIATE THIS OPPORTUNITY TO TESTIFY IN SUPPORT OF S. 516 BY SENATORS WARNER AND MCCLURE. AS A COSPONSOR OF H.R. 4067, A SIMILAR HOUSE BILL, I STRONGLY SUPPORT YOUR CONTINUED EFFORTS TO ADVANCE A LEGISLATIVE PROPOSAL WHICH WILL ENHANCE OUR DEVELOPMENT OF GEOTHERMAL ENERGY. THE TIME HAS COME FOR US TO REMOVE THE ROADBLOCKS WHICH EXIST AND PROVIDE THE INCENTIVES TO ADVANCE THE DEVELOPMENT OF THIS RELATIVELY UNTAPPED ENERGY RESOURCE.

I WOULD ALSO LIKE TO TAKE THIS OPPORTUNITY TO ACQUAINT THE NEW MEMBERS OF THE ENERGY AND MINERAL RESOURCES SUBCOMMITTEE WITH A GEOTHERMAL ISSUE IN MY CONGRESSIONAL DISTRICT AND BRING OUR SENIOR MEMBERS UP-TO-DATE ON THE EVENTS WHICH HAVE OCCURRED SINCE THIS SUBCOMMITTEE FIRST LOOKED INTO THIS MATTER DURING THE 96TH CONGRESS.

AS MY COLLEAGUES KNOW,THE LARGEST PRODUCING GEOTHERMAL AREA AND THE FIRST ONE OF ITS KIND IN THE UNITED STATES IS LOCATED IN NORTHERN CALIFORNIA IN MY CONGRESSIONAL DISTRICT. THE AREA IS KNOWN AS THE GEYSERS.

THE CORE OF THE GEYSERS IS PRIVATELY OWNED LAND BEING DEVELOPED PRIMARILY BY PACIFIC GAS AND ELECTRIC.

Presently, 14 units generate 798 MW of electricity. Four more plants under construction or nearing completion of the siting process will raise that total to 1,238 MW by 1983, or 6 to 8% of PG & E's total generating capacity, enough to serve a city of approximately one million people, or replace 1 million barrels of oil per year.

In addition, 18 more units which are going through the siting process or are at least on the drawing boards could, if the resource is available, raise total generating capacity to 2,404 MW by 1988. The extent of the resource is still a big unknown, but many observers of The Geysers development now agree that the resource will probably support a generating capacity of 2,500 MW, the equivalent of more than 2 million barrels of oil per year.

Adjacent to the area are lands which were homesteaded under the 1916 Stockraising Homestead Act. The surface was transferred to private ownership and the subsurface mineral rights were reserved by the Federal Government.

A CONFLICT HAS ARISEN AS A RESULT OF THE 1977 9TH CIRCUIT COURT DECISION DECLARING THAT FOR PURPOSES OF THE STOCKRAISING HOMESTEAD ACT MINERAL RESERVATION THAT GEOTHERMAL RESOURCES WERE RESERVED TO THE GOVERNMENT. UP UNTIL THIS COURT DECISION, THE LANDOWNERS HAD ACTED IN GOOD FAITH RELIANCE ON CORRESPONDENCE FROM AN EARLIER INTERIOR DEPARTMENT SOLICITOR ASSURING THEM THAT GEOTHERMAL RESOURCES ARE SIMPLY WATER AND AS SUCH ARE NOT CONSIDERED TO BE A MINERAL UNDER MINERAL LEASING LAWS. MANY OF THE LANDS HAVE REMAINED IN THE SAME FAMILIES AS THOSE WHO FIRST HOMESTEADED THEM. OTHERS HAVE BEEN PURCHASED BY PERSONS BELIEVING THEY HAD THE RIGHT TO DEVELOP THE GEOTHERMAL STEAM.

THE SITUATION IS COMPOUNDED BY PROBLEMS ARISING FROM PREVIOUS ADMINISTRATIVE ACTIONS PERTAINING TO THE ACTUAL LEASE AGREEMENTS AND BONDING PROCEDURES.

THESE ISSUES WERE BROUGHT TO THE SUBCOMMITTEE'S ATTENTION DURING THE LAST CONGRESS. THE HOUSE MINES AND MINING SUBCOMMITTEE HELD A FIELD HEARING IN SANTA ROSA, CALIFORNIA ON THIS SPECIFIC ISSUE. FOLLOWING LENGTHY DISCUSSIONS WITH THE AFFECTED LANDOWNERS, ADMINISTRATION OFFICIALS AND THE CHAIRMAN AND RANKING MEMBER OF YOUR SUBCOMMITTEE AND FULL COMMITTEE, WE DEVELOPED LANGUAGE WHICH WAS PLACED IN THE HOUSE AND SENATE REPORTS DIRECTING THE GENERAL ACCOUNTING OFFICE TO UNDERTAKE A STUDY OF THE SITUATION AND PRESENT ITS FINDINGS TO THE CONGRESS.

The report has been completed. It is entitled "The Impact of Geothermal Development on Stockraising Homestead Landowners" dated April 16, 1981.

During the time the GAO was preparing its report, we continued our efforts to address the concerns of the landowners administratively through the Bureau of Land Management.

Two significant decisions were made by BLM. First, in December, 1979 the Bureau issued an instruction memorandum to field managers to ensure that the protection bonds, which must be presented by the lessee, are adequate to protect the surface owners from "all reasonable direct damage" that may result to their property on the leasehold as a result of actions taken pursuant to geothermal leasing.

In July 1980, the Department issued a Solicitor's opinion which stated that neither the United States nor a lessee has the reserved right under the Stockraising Homestead Act to utilize geothermal resources on stockraising land without obtaining the consent of the landowner. In other words, a lessee may not site a powerplant on a lease without the permission of the landowner. This decision is highly significant as it should enable surface owners to negotiate a compensation agreement with the lessee.

Occidental has filed suit challenging this decision; however, no decision on the case has been rendered as yet.

It is my intention to pursue with the Chairman an amendment to S. 1516 to allow the surface owner an opportunity to match the high bid. My amendment would be limited to the Geysers area where this unique situation exists.

A similar provision currently exists with regard to state lands where the surface is privately owned and the minerals were reserved. It has been in effect since 1976 and has occurred in four of eight tracts leased in the Geysers by competitive bidding.

To quote Donald L. Hoagland, Geothermal Energy Program Specialist with the California State Lands Commission in June, 1980, "While there have been some protests from industry about our system, our record thus far indicates there is no dearth of bidders and bidders with money. Since our two major goals from the outset have been to open up the market and maximize the financial return to the state, it appears we are on the right course."

I believe a similar system can work equally well on Federal lands.

A copy of our amendment is attached.

I appreciate your attention to this problem. I believe it is imperative that we arrive at a fair and responsible solution so that we may proceed with the development of the geothermal resource in this area.

It is my desire, and always has been, to expedite the use of this valuable and relatively clean energy source, while assuring the reasonable protection of the landowners rights.

Thank you, Mr. Chairman.

MPB784

AMENDMENT TO H.R. 4067

Page 2, line 23, after ''(a)'' strike out ''If'' and substitute ''(1) Except as provided in paragraph (2), if''.

Page 3, after line 5, insert:

(2) In the case of lands within the ''Geysers Known Geothermal Resource Area'' in California where the United States holds geothermal rights but is not the surface owner, the Secretary shall conduct competitive bidding and after the Secretary has determined the highest qualified bid, the Secretary shall notify the surface owner of such bid. The notice shall be deemed to be effective when received by the surface owner or 15 days after being sent, whichever comes first. The owner may, within 60 days after such notification, submit a bid identical to the highest qualified bid, in which case the Secretary shall issue a lease to the surface owner. Such bid by the surface owner shall be deemed to be effective when received by the Secretary. If the owner fails to file such a bid within such a time or is unqualified, the Secretary may proceed with the award of the bid to the highest qualified bidder.

Senator WARNER. Thank you very much, Mr. Congressman. At this time I will confer with Mr. Wallop. We have an unexpected development here. There is a rule in the Senate which enables us to continue hearings after the Senate has convened, but we have had an objection on the floor preventing us to continue past 11 a.m., thus we have only 38 minutes in which to continue.

Senator WALLOP. I think, it would be my hope that we can receive as much of the testimony as possible.

[A discussion was held off the record.]

Senator WARNER. We are going to suggest that the local witnesses be given another opportunity on another day. Therefore, to accommodate those who come from afar, we will proceed with them. Of course, we have got to hear from Mr. Russell, the administration witness, first.

Senator WALLOP. Mr. Chairman, I think that is an equitable solution to our time constraint. I think most local people would not mind returning, and those who have come from afar, it is pretty hard to ask them to come back again.

Senator WARNER. We apologize for this. It is totally unanticipated. Someone has lodged an objection to this committee proceeding beyond the 2-hour limit.

Senator WALLOP. Which is 11 o'clock.

Senator WARNER. So we will now thank you, Mr. Clausen, and now hear from Mr. Russell. We are delighted to have the Congressman join us here, and we will hear from you, Mr. Russell.

STATEMENT OF DAVID C. RUSSELL, DEPUTY ASSISTANT SECRETARY, LAND AND WATER RESOURCES, DEPARTMENT OF THE INTERIOR, ACCOMPANIED BY DR. RAYMOND HERRMANN, DIRECTOR, WATER RESOURCES LABORATORY, NATIONAL PARK SERVICE; AND DR. ROY BAILEY, COORDINATOR, VOLCANO HAZARDS PROGRAM, U.S. GEOLOGICAL SURVEY

Mr. RUSSELL. Good morning, Mr. Chairman, Senator Wallop, Congressman Clausen. I appreciate the opportunity to present the administration's views on S. 1516 introduced by you, Mr. Chairman, and Chairman McClure, and on S. 669 introduced by Senator Jackson.

With me to address questions of a technical nature are on my right Dr. Roy Bailey a volcanologist with the U.S. Geological Survey, and coordinator for the volcano hazards program.

On my left is Dr. Ray Herrmann, a geologist and Director of the Water Resources Laboratory with the National Park Service in Fort Collins, Colo.

With your permission, Mr. Chairman, I would like to submit my prepared testimony for the record.

Senator WARNER. Without objection.

Mr. RUSSELL. Together with testimony by Mr. Russ Dickenson, the Director of the National Park Service who is not able to be here today, and summarize that testimony and a few background remarks.

In 1970, when the Geothermal Steam Act passed, I suppose many people had either never heard of this clean, virtually untapped, alternate energy resource, or they thought it was a new type of long underwear.

Geothermal development, however, has come a long way over the last decade as a localized energy resource. The electric potential of geothermal resources is significant. Already more than half of San Francisco's electric power is derived from northern California's geothermal resources.

Other current uses in Idaho, Nevada, Oregon include space heating, crop drying, and greenhouse use. Since over 50 percent of the geothermal resource base in the United States occurs on publicly owned lands, if the potential for energy production is to be achieved it is essential that there be an aggressive program in place for making Federal lands available for geothermal development.

We have some problems there. Although approximately 1,750 noncompetitive leases have been issued since the Department's leasing program was begun in 1974, over 2,000 lease applications are still pending. In addition, less than one-half of those Federal lands designated as known geothermal resource areas, KGRA's, have been offered at competitive lease sales. Also about one-third of all leases issued have been relinquished but have yet to be reoffered for lease.

Mr. Chairman, these are administrative problems. Backlogs we view as unacceptable, and they deserve greater attention than has been given them in previous years.

Demonstrating the administration's commitment to increased leasing and zero backlog, the Secretary announced yesterday a series of administrative actions being taken by the Department to increase the availability of publicly owned geothermal resources for exploration and development. Actions ordered by the Secretary include setting time limits for processing noncompetitive lease applications and holding competitive lease sales for all unleased known geothermal resource areas, and implementing a simultaneous leasing procedure to allow relinquished leases to be reoffered. Copies of that Secretarial directive and press release have been made available to staff.

In the last Congress, because the Interior Department had not addressed many of the leasing backlogs and administrative delays, legislation considered by the Senate, including S. 1330 introduced by Senator McClure, contained a number of specific provisions designed to put the Department into a more responsive mode of leasing. The bill passed by the Senate last year carried many of those specific administrative requirements; for example, that the company must offer lands classified for competitive leasing within 18 months after nomination from any qualified bidder—clearly an attempt, and a reasonable one, to get Interior off its duff and into the leasing business.

S. 669 introduced by Senator Jackson is that Senate-passed bill of last session. We would hope the Senator would be convinced by our recent efforts in addressing the delays in leasing and the priority we are assigning to timeliness to support a less detailed statutory fix such as that considered by Congressman Santini, and Marriott, and by Chairman McClure, and Senator Warner.

Mr. Chairman, the Department is addressing administrative problems and delays in leasing, but more is needed. We believe it is essential that certain statutory provisions of the 1970 Steam Act be amended to permit geothermal development to reach its potential. The Department not only supports the goals of S. 1516, a leaner bill than S. 669, but also recognizes the urgency for its enactment.

Certainly the most important provisions contained in S. 1516 are those in section 8 which would increase the per State acreage limitation from 20,480 acres to 51,200 acres. The bill would also authorize the Secretary of the Interior to increase that 51,200-acre limit to 115,200 after December 24, 1985.

Limitations imposed by the Geothermal Steam Act of 1970 have stifled not only the development of geothermal resources, but also the development of new technology and techniques by discouraging corporations from even participating in the Federal geothermal program.

Bureau of Land Management records show that about 50 lessees, primarily in Nevada, Oregon, and Idaho, are currently prevented from establishing new blocks of land for exploration as a result of the acreage limit which, by the way, is only one-twelfth of the limit established for oil and gas leases.

In addition, many more lessees will soon be reaching their acreage limit in California and Idaho. The Bureau has estimated that this single provision, increasing the acreage limit, could bring in new receipts to the Treasury of $60 to $80 million by mid-1983 in the form of bonus bids.

Without an increase in the acreage limit, our efforts to administratively increase geothermal leasing will be counterproductive. Already we have had requests from industry to postpone these sales because the company wanted to compete for leases to be offered but was at or near the acreage limit. This unfortunate trend will continue to negatively affect competition and chill bids at lease offerings until the acreage limit is increased.

Thus the administration urges speedy enactment of this provision. In addition, in increasing the acreage limit for geothermal leases, the bill would also except from the acreage limit those leases shown to be capable of commercial production. We consider that an especially valuable provision.

One final comment on S. 1516 and S. 669 pertains to protection of national parks. Although we question whether there is a need for additional legislative protection of parks since specific authorities and responsibilities are already mandated elsewhere, there has been a great deal of concern over the possible effects of geothermal development near certain parks.

We believe the public deserves absolute assurance that their national parks will not be damaged in any way. As the Nation's principal conservation agency with the responsibility for most of our nationally owned public lands, natural resources, and national parks, we recommend that S. 1516 contain language similar to that appearing in the bill which Congressman Clausen has cosponsored, H.R. 4067, which includes a special provision for national parks.

The Secretary, I might add parenthetically, was pleased to learn yesterday that you, Mr. Chairman, and Senator Wallop, and Senator McClure had reached agreement in principle to support vigorous efforts to protect the thermal features of Yellowstone National Park.

In conjunction with strong affirmative action that the Department is already taking to protect those parks with unique nationally significant thermal features, the Secretarial directive which I mentioned reiterates that commitment that the necessary, absolute assurances to the public will be provided.

Mr. Chairman, we are available for questions.

[The prepared statements of Mr. Russell and Mr. Dickenson, together with the Secretarial directive and press release follow:]

STATEMENT OF DAVID C. RUSSELL, DEPUTY ASSISTANT SECRETARY, LAND AND WATER RESOURCES, DEPARTMENT OF THE INTERIOR, BEFORE THE SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES, COMMITTEE ON ENERGY AND NATURAL RESOURCES, UNITED STATES SENATE, ON S. 1516, A BILL "TO AMEND THE GEOTHERMAL STEAM ACT OF 1970 TO EXPEDITE EXPLORATION AND DEVELOPMENT OF GEOTHERMAL RESOURCES."

I am pleased to appear today before this subcommittee to discuss S. 1516, a bill introduced by Senators Warner and McClure to amend the Geothermal Steam Act of 1970 to expedite the exploration for and development of geothermal resources.

The Department not only supports the goals of this legislation but also recognizes an urgency for its enactment, particularly in light of its benefits in terms of aiding economic recovery and developing additional domestic energy supplies. With certain changes, we believe the bill will both increase the availability, development and utilization of publicly-owned geothermal resources, and bring substantial new and largely unexpected revenues to the Treasury.

The Department of Energy and the U.S. Geological Survey have agreed that, by the year 2000, geothermal energy could significantly contribute to lessening imports of foreign oil. The Interagency Geothermal Coordinating Council likewise states in its Fourth Annual Report to the President and Congress that by the year 2000 geothermal energy production could be equivalent to what would be provided by 1.5 million barrels of oil per day.

Since over 50 percent of this geothermal resource in the United States exists on Federal lands, if the substantial potential for energy production is to be achieved, it is clearly essential that there be an aggressive program for making Federal lands available for geothermal development. Accordingly, the Department of the Interior is currently reviewing all aspects of the Federal leasing program to streamline administrative procedures and to remove burdensome or counterproductive regulatory requirements.

However, certain legislative changes are needed if these efforts are to be successful. S. 1516 would accomplish those changes that we believe are necessary to encourage development of the Federal geothermal resource, while also increasing revenues and helping to balance the budget.

Certainly the most important provisions contained in S. 1516 are those in section 8 which would increase the per State acreage limitation from 20,480 to 51,200 acres. The bill would also authorize the Secretary of the Interior to increase the 51,200-acre limitation to 115,200 acres after December 24, 1985.

Limitations imposed by the Geothermal Steam Act of 1970 have stifled not only the development of geothermal resources but also the development of new technology and techniques, by discouraging corporations from even participating in the Federal geothermal program. Bureau of Land Management records show that about 50 lessees, primarily in Nevada, Oregon and Utah, are currently prevented from establishing new blocks of lands for exploration as a result of the acreage limitation, which is only one-twelfth of that established for oil and gas. In addition, many more lessees will soon be reaching their acreage limit in California and Idaho. The Bureau has estimated that this single provision - increasing the acreage limitation - could bring new receipts of $60-80 million to the Government by mid-1983, in the form of competitive bonus bids.

In addition to increasing the acreage limitations for geothermal leases, S. 1516 would also except from the acreage limitation those leases shown to be capable of commercial production. We consider this an especially valuable provision in that it will promote accelerated exploration and development of the resource.

Section 4 of S. 1516 would provide a new, more restrictive definition of a "known geothermal resource area" (KGRA). It would remove the test of "competitive interest" as an indicator of the presence of geothermal resources in an area and would, instead, require substantial physical evidence that the area would serve the "primary purpose of generating electricity in commercial quantities."

Under the Geothermal Steam Act of 1970, a KGRA is defined by competitive interest, nearby discoveries and geology. If, in the opinion of the Secretary, the prospects for extraction of geothermal resources are sufficient to warrant expenditure of money for that purpose by persons experienced in geothermal matters, then the area is classified a KGRA and is leasable only under the competitive system.

We urge retention of the present definition of a KGRA for two reasons. First, with respect to the "competitive interest" test, reclassification by the Department, as discussed below -- rather than statutory change -- would achieve the desired result. Where overlapping applications do reflect sufficient competitive interest to result in successful competitive sale, leasing should be by competitive sale. However, since most of these overlapping applications were filed during the flurry of activity immediately following passage of the GSA in 1970 and have been offered unsuccessfully for competitive sale several times over the years, we intend to resolve the problem by reclassifying such KGRAs to permit noncompetitive leasing. I will explain this plan further in the discussion of section 5 of S. 1516. We believe "competitive interest" should therefore remain a criterion for establishing new KGRAs.

Second, we do not support the more restrictive geologic test for identification of a KGRA, that is, that the area serve the primary purpose of generating electricity, because of the negative effect this change would have on revenues.

Section 5 of S. 1516 also would provide that, if no bids are received on a KGRA when offered for competitive bidding, the area would be declassified and leased to the first applicant. In doing so, the amendment recognizes the fact that continued classification of these lands for competitive bidding may needlessly withhold them from leasing and thus prevent collection of lease rentals and delay exploration and development. However, we question the need for this statutory change.

We feel strongly that reclassification of KGRAs to permit noncompetitive leasing after sufficient unsuccessful competitive offerings is not only reasonable but necessary to enhance exploration of unproven acreage. However, reclassification after only one competitive offering is probably not a sufficient test of the competitive market.

Bureau of Land Management records indicate that, although over 70 percent of all parcels offered a second or third time have received no bids, the Government has received over $2.1 million from parcels which did receive bids on reoffering. We do believe, however, that certainly after three offerings, and possibly after only two, parcels should be declassified. We recognize that authority for such reclassification already exists and we intend to assign high priority to such efforts in the future.

In sum, we feel reclassification is an important component of a well-managed geothermal leasing program, but should remain flexible, so as to allow the Secretary to determine in which instances the public would be better served by noncompetitive leasing.

Another amendment which would expedite the development of geothermal resources is found in section 3 of S. 1516. This provision increases the amount of Federal land which the Secretary of the Interior may lease.

The Geothermal Steam Act of 1970 limits the Secretary's leasing authority to geothermal resources in lands administered by Interior or by the Forest Service, and in lands conveyed by the United States subject to a reservation to the United States of the geothermal resources. S. 1516 would expand the Secretary's leasing authority to "any lands administered by another Federal agency or department, including public, withdrawn, or acquired lands," subject to the continued exclusion of lands described in section 15(c) of the Act. However, we recommend that the bill be amended to insure that lands managed by Federal agencies other than Interior can be leased only with the approval of the affected agency and subject to such terms and conditions as the agency head might prescribe.

Section 11 of S. 1516 would add three new subsections to section 23 of the 1970 Act. The new subsections would encourage geothermal exploration and development.

New subsection 23(c) would authorize the Secretary to issue permits for the use of geothermal resources for noncommercial application without requiring either a lease or compensation. This would be especially applicable to grantees under the Stock Raising Homestead Act. The provision would not apply to generating electricity in any amount.

Under new subsection 23(d), if the Federal interest in a geothermal energy research facility, pilot plant or demonstration facility utilizing geothermal resources subject to the Act is transferred to anyone, the Secretary may issue a no-cost permit allowing surface use and utilization of geothermal resources sufficient for the continued operation of the plant or facility for the life of the project. This would protect investments where circumstances and equity indicate a no-cost permit is proper.

New subsection 23(e) would authorize each Federal agency head to develop geothermal resources within lands under his jurisdiction, for the use and benefit of such agency. It requires the agency director to obtain the concurrence of the Department of the Interior, who must determine that such development is in the public interest and will not deter commercial development which might otherwise be more beneficial.

Although these three new subsections are not as dramatic as increasing the acreage limitations, we believe they would significantly increase geothermal exploration, research and development.

Our final comment on S. 1516 pertains to protection of National Parks. Although we question whether there is a need for additional legislative protection of Parks, since specific authorities and responsibilities are already mandated elsewhere, there has been a great deal of concern over the possible effects of geothermal development near certain Parks.

We believe the public deserves absolute assurance that their National Parks will not be damaged in any way. As the Nation's principal conservation agency with responsibility for most of our nationally-owned public lands and natural resources and the National Parks, we recommend that S. 1516 contain language similar to that appearing in H.R. 4067, which includes a special provision for National Parks.

We believe this language, in conjunction with the strong affirmative action the Department is already taking to protect those parks with unique, nationally significant features, will provide the necessary absolute assurances to the public.

This completes my statement. I will be pleased to answer questions.

STATEMENT OF RUSSELL E. DICKENSON, DIRECTOR, NATIONAL PARK SERVICE, DEPARTMENT OF THE INTERIOR, BEFORE THE SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES, OF THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES ON S. 669, "A BILL TO AMEND THE EXISTING LEASING AND PERMITTING LAWS AND FOR OTHER PURPOSES, AND S. 1516, "A BILL TO AMEND THE GEOTHERMAL STEAM ACT OF 1970 (30 U.S.C. 1001 ET SEQ.) TO EXPEDITE EXPLORATION AND DEVELOPMENT OF GEOTHERMAL RESOURCES."

October 27, 1981

Mr. Chairman and Members of the Committee, I appreciate the opportunity to appear before this Committee to adress the proposed amendments to the Geothermal Steam Act of 1970, as they affect the integrity of the National Park System.

As you know, the development of geothermal resources is an important part of the total energy program of the Administration. The Department and the National Park Service are convinced that geothermal energy can be developed in a way which will continue to maintain the high quality all Americans have come to expect in their national parks.

Many of our national parks, especially Yellowstone and Lassen Volcanic National Parks, have become symbols of the great outdoors, and each year millions of people from all over America and the world visit these parks to see the wonders of nature that can be found in so few places around this globe.

These two great landmarks are visited, not only because of their natural beauty, but also because of their geothermal features. Both present tremendous examples of thermal activity and rank high on the list of natural wonders that can be found in the United States. Secretary Watt has asked me to convey his personal commitment that under no condition will he allow these natural wonders to be damaged. These resources hold a special place in our hearts, and we will do everything possible to make sure that millions of people, now and in the future, can continue to enjoy their splendor.

It is with these thoughts in mind that the Department and the National Park Service support the premise on which this legislation was initiated. We strongly recommend, therefore, that S. 1516 include a park protection provision similar to that contained in H.R. 4067, sponsored by Congressmen Marriott and Santini.

Mr. Chairman, it is our recommendation that whatever bill the committee adopts as a vehicle for amending the Geothermal Steam Act of 1970 should contain language providing for buffer zones around Yellowstone and along the southern boundary of Lassen of the type included in the Marriott-Santini bill. H.R. 4067 contains a provision to provide additional protection for nationally significant thermal features within Yellowstone and Lassen Volcanic National Parks.

To eliminate the possibility that an underground source of a thermal feature could be tapped from lands outside the boundaries of these parks, the Secretary would be directed to establish a 15-mile buffer zone around Yellowstone and a one-mile buffer zone along the southern border of Lassen. No geothermal leases could be issued within these zones. The amendment also gives the Secretary the discretion to require that lessees establish monitoring programs; to use resulting information to modify buffer zone boundaries around these parks; and to halt immediately any activities which are likely causing significant adverse effects on these parks' nationally significant thermal features.

It should also be pointed out that according to the USGS, the scientific and geologic evidence available indicates that only a relatively small buffer zone is actually necessary for Yellowstone National Park. Nevertheless, a 15-mile buffer zone has been provided in the bill, as added security. We support this approach.

In addition to the Yellowstone and Lassen Volcanic National Park language, H.R. 4067 also contains a special provision for the Island Park Caldera, located west of Yellowstone. Under this provision, the Secretary of the Interior is authorized to allow geothermal leasing within a designated area within the Caldera; he is also directed to require lessees to implement monitoring programs and to take other actions necessary to protect nationally significant thermal features.

We are confident, based on the best available scientific evidence and data provided by the USGS, that development can proceed in Island Park without any adverse effect on geothermal features within Yellowstone, if such provisions are enacted into law and added to our existing authority.

Recognizing the need for increased geothermal exploration and development, we strongly recommend that Senate Bill 1516 be amended to include the additional protective measures included in H.R. 4067.

A different approach to park protection has been offered by Senator Jackson in S. 699. That approach provides for rulemaking to create a list of nationally significant geothermal features and a second rulemaking prior to the issuance of a drilling permit. The Department fears this multiplicity of rulemaking creates the likelihood that geothermal development could be hamstrung indefinitely by litigation, and we therefore do not recommend its enactment.

We note here that the National Park Service has already identified 21 units of the Park System, including Lassen and Yellowstone, which contain thermal features, like hot springs, geysers, steam vents and volcanic activity. These features certainly require protection. However, we believe existing statutory provisions should be more than adequate to provide such protection, except in the case of Lassen and Yellowstone.

The S. 669 approach is unnecessary, because the Department already has sufficient authority to protect nationally significant geothermal resources and is using that authority to implement changes that are necessary to protect thermal features throughout the National Park System.

We think it is advisable to deal by statute only with those very special cases requiring added protection. H.R. 4067 does exactly that and we believe its approach is preferable to others. Thus we support S. 1516, with the amendments mentioned by Mr. Russell and with the addition of the section 15 protection from H.R. 4067.

The Department's responsibility as the Steward of our public lands is to guarantee environmental balance, proper land management and the protection of our national treasures, so that all future generations can enjoy them as we do. We feel it would be far easier to meet these standards if the requested additional protective measures are added.

We believe the approach the Department is recommending today is a balanced approach. It provides statutory protections for our two most renowned National Park thermal areas. It allows for continued use of our existing environmental authority to protect other nationally significant thermal features in our parks.

Thank you very much for your time. Mr. Chairman, I would be happy to respond to any questions Members of the Committee may have.

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

SEP 9 1981

Memorandum

To: Director, Bureau of Land Management
Acting Director, Geological Survey
Director, National Park Service

Through: Assistant Secretary, Land and Water Resources
Assistant Secretary, Energy and Minerals
Assistant Secretary, Fish and Wildlife and Parks

From: The Secretary

Subject: Expediting Geothermal Leasing Program

The Department's geothermal leasing program has now been in operation for over seven years. Although approximately 1,750 noncompetitive leases have been issued during that time, over 2,000 lease applications are still pending. In addition, less than one-half of those Federal lands designated as known geothermal resource areas (KGRA) have been offered at competitive lease sales. Also, about one-third of all leases issued have been relinquished and have yet to be reoffered. Such backlogs are unacceptable at a time when the Nation is attempting to assess and develop its alternate energy resources, so as to increase domestic energy production, augment gains made by energy conservation, and further reduce imports of foreign oil. Increased leasing, exploration and production, however, must be accompanied by increased measures to protect environmental resources and unique geothermal features, particularly those in our national parks. It is important that we add special protections to existing environmental standards and insure protection of national treasures, such as Old Faithful.

I firmly believe that a dramatic acceleration in the geothermal leasing program is possible, consistent with all legal mandates. The benefits to the public can be substantial in terms of both revenues received and energy produced. Accordingly, you are to take all action necessary to implement promptly the following.

1. Noncompetitive Lease Applications

   It is expected that all pending noncompetitive lease applications will be fully processed within 12 months. Once the current backlog is eliminated, all new applications should be routinely processed in 90 days or less.

2. Competitive Lease Sales

All unleased KGRA parcels are to receive necessary environmental reviews and, if appropriate, to be offered at competitive lease sales within 12 months. A review for possible reclassification of parcels receiving no bids is to receive high priority.

3. Reoffering of Leases

The BLM is to transmit promptly to the Federal Register final regulations to allow reoffering of relinquished, cancelled, expired or terminated leases. An active simultaneous leasing program is to be implemented as soon as the regulations are final.

4. Environmental Reviews

Compliance with the National Environmental Policy Act is to be achieved at the appropriate points in the leasing, exploration and development process. To expedite reviews and reduce duplication of effort, to the maximum extent possible all prelease environmental analyses are to rely on relevant information in existing environmental reviews or land use plans. When actual development plans are submitted, environmental reviews and supporting resource inventories are to be directed at, and limited to, identifying impacts that are reasonably certain to occur; impacts that are hypothetical or insignificant may be noted but should not be discussed in detail.

In addition, BLM is to prepare proposed regulatory changes providing that, whenever possible, for noncompetitive geothermal leases, compliance with NEPA is to be accomplished primarily at the time plans for operation are received, rather than at the time the leases are issued. This proposal is to be forwarded within 30 days to the Assistant Secretry for Policy, Budget and Administration for publication in the Federal Register and is to address the following justifications for the proposed changes, among others:

(1) Impacts on the land occur, not at the time a lease is issued (this is an exercise in paperwork), but after plans of operations are received. (2) Operating experience over the past seven years has shown that, in most cases where noncompetitive geothermal leases are issued, plans for operations are never received--either because initial geophysical and other assessments reveal that geothermal potential is lower than originally thought, or because current technologies and the economics of evaluating, developing and marketing a geothermal resource are found to be inadequate to justify further investments.

It is thus in the public interest not to spend time and money preparing detailed environmental studies for areas that never go beyond lease issuance stage. (3) Special stipulations to protect environmental values can be appended to operating permits. These can be drafted to address concerns and values that are unique to the specific area being considered for operations and may exclude: (a) areas determined to be particularly sensitive; (b) activities or means of access determined to pose unnecessary risks of environmental harm or to have unnecessary impacts which could be avoided; and (c) activities or means of access for which less impairing alternatives are reasonably available, considering economic, technical and safety factors.

5. Wilderness Study Areas (WSA)

It is essential that the nature and extent of geothermal resources in wilderness study areas be understood in sufficient detail that the Department, Congress and American public can make informed choices concerning conflicting resource values and the potential effects of wilderness designation, in terms of energy opportunities foregone. Therefore, geophysical exploration operations, conducted in accordance with reasonable environmental and reclamation stipulations, are to be permitted in WSAs and will be considered as not impairing the suitability of such lands for inclusion in the Wilderness System. Permanent roads should not be permitted; if road construction, grading operations or access on skids is necessary, these activities are to be controlled through stipulations, to minimize impacts, provide for reclamation and insure that permanent impairment does not result. This approach will enable the Department to protect environmental values and preserve wilderness characteristics and options, while developing adequate data on which to base fully informed land use decisions.

6. Cooperative Agreements and Interagency Relations

The BLM and GS are to review existing cooperative agreements and procedures to ensure that the above measures will be implemented at minimal or no increase in agency budgets. Emphasis should be placed on reducing paperwork, eliminating unnecessary steps and specifying agency response times. To the extent possible, the Forest Service should be made a full partner in any revised agreements and proceedings.

7. National Park Protections

Special protections for nationally significant thermal features are required for Yellowstone and Lassen National Parks. The BLM, in coordination with the Forest Service where appropriate, is to consult with the National Park Service on protective measures and with the USGS on monitoring procedures prior to offering lands for lease outside Yellowstone and Lassen National Parks. The GS is to require monitoring of the effects that development and production will have on the hydrologic regime of lands adjacent to the National Park System, to insure that geothermal values within the parks are fully protected.

James G. Watt

DEPARTMENT of the INTERIOR
news release

OFFICE OF THE SECRETARY

For Release October 26, 1981 Reed (202) 343-5717

INTERIOR MOVES TO INCREASE GEOTHERMAL LEASING

Actions aimed at freeing-up the Federal geothermal leasing program have been ordered by Interior Secretary James Watt. "Clean energy from largely untapped and virtually renewable geothermal resources on America's public lands should be encouraged, not thwarted, by Government policy," Secretary Watt said.

Actions ordered by the Secretary include setting time limits for processing noncompetitive lease applications, holding competitive lease sales for all unleased known geothermal resource areas (KGRA's), and implementing a simultaneous leasing procedure to allow relinquished leases to be reoffered. The Secretary reaffirmed that there would be no geothermal leasing within a National Park. He said strict monitoring procedures would be conducted on any geothermal leasing proposals for which the Department of the Interior may have responsibility.

The directive by Secretary Watt complements geothermal leasing legislation introduced by Congressmen Marriott and Santini in H.R. 4067, and similar legislation introduced by Senators Warner and McClure, S. 1516. Of particular importance in the legislation is a provision to increase the present State acreage limit from 20,480 to 51,200 acres. About 50 geothermal lessees are at the current acreage limit. Increasing the limit would likely bring $40 to $60 million in bonuses over the next year and a half to the U.S. Treasury (with even larger revenues coming from royalties) and spur efforts to bring on this alternate energy resource.

In the Secretarial memorandum to the Directors of the Bureau of Land Management, the U.S. Geological Survey (USGS) and the National Park Service, Watt pointed out that Interior's geothermal leasing program has now been in operation for over seven years.

"Although approximately 1750 noncompetitive leases have been issued during that time, over 2000 lease applications are still pending," Watt said. "Less than one-half of those Federal lands designated as known geothermal resource areas have been offered at competitive lease sales."

The Interior Secretary also noted that about one-third of all leases issued have been relinquished and have yet to be reoffered. "Such backlogs," Watt noted, "are unacceptable at a time when this Department is committed to increasing domestic energy production. In addition, we must be fully protective of thermal features in our National Parks. It is important that we apply special protections to existing environmental standards to ensure protection of national treasures, such as Old Faithful. I firmly believe that a dramatic acceleration in the geothermal leasing program is possible, consistent with all legal mandates."

(more)

The specific actions ordered by Secretary Watt include:

-- processing of all pending noncompetitive lease applications within 12 months, new applications to be processed within 90 days;

-- unleased KGRA parcels to receive necessary environmental reviews and offered at competitive lease sales within 12 months, with priority review for declassification of parcels receiving no bids;

-- BLM to finalize rulemaking to allow reoffering of relinquished leases, followed by implementation of an active simultaneous leasing program as soon as the regulations are made final;

-- use of relevant information contained in existing environmental reviews or land use plans, to the maximum extent possible, in preparing pre-lease environmental reviews;

-- allowing carefully limited geophysical exploration operations in accordance with Congressional authority in areas under study for possible wilderness designations with proper safeguards to prevent impairing of suitability of such lands for inclusion in the wilderness system;

-- a closer working relationship between BLM and USGS to implement the foregoing measures, and to the extent possible, to make the Agriculture Department's U.S. Forest Service a full partner in future agreements and procedures;

-- a directive to BLM to consult with the National Park Service on protective measures and with the USGS on monitoring procedures prior to offering lands for lease outside Yellowstone and Lassen National Parks; and a requirement that USGS monitor all development on Federal lands in the vicinity of other National Parks containing geothermal features.

Watt said that the benefits to the public could be substantial in terms of both energy produced and revenues received while fully protecting our National Parks.

x x x

Senator WARNER. Thank you. We may submit questions for the record in order to get as much as we can done during this hearing, also to give some balance and perspective because we realize there are a number of persons that have volunteered to come and speak not necessarily in opposition, but certainly alert the committee to certain problems here.

Therefore, we would like to have Mr. Bloomquist, Mr. Wilson, Mr. Buchwald, together with Mr. Wright, each of those four witnesses having come from considerable distances, and then in order to provide the environmental perspective an opportunity to speak, we will have Mr. Sopher of the Wilderness Society speak for the balance of the 5 minutes before 11 o'clock.

Is Mr. Sopher still present in the room?

Mr. SOPHER. Yes, sir.

Senator WARNER. Thank you very much. Mr. Bloomquist, could you kindly lead off?

Mr. BLOOMQUIST. Mr. Chairman, members of the committee——

Senator WALLOP. I'm sorry to interrupt. I don't think necessarily you should view yourselves as a panel, but it is a matter of convenience.

STATEMENT OF DR. R. GORDON BLOOMQUIST, GEOTHERMAL SPECIALIST, WASHINGTON STATE ENERGY OFFICE

Dr. BLOOMQUIST. My name is Dr. R. Gordon Bloomquist.

Senator WARNER. We are going to ask that you pull that microphone closer to yourself. There are a lot of people out there who are anxious to hear your comments.

Dr. BLOOMQUIST. I am a geothermal specialist with the Washington State Energy Office, and I serve as chairman of the Washington State Interagency Geothermal Development Council. I am very pleased to have had this opportunity to address the committee regarding both S. 669 and S. 1516.

When I was informed about the hearing I was not told that the hearing would also include S. 669 so my written comments which you have before you include only testimony regarding S. 1516.

Senator WARNER. At this point I indicate that all submitted statements will be included in their entirety in the record for all witnesses appearing at this hearing today.

Dr. BLOOMQUIST. I have summarized my testimony and tried to include as many places as possible since we are anxious to expedite the passage of this legislation.

Passage of legislation to amend the Geothermal Steam Act of 1970 at the earliest possible time is essential to the development of the Nation's geothermal resources. Many of the original provisions of the act have served to almost completely stifle the development of viable geothermal energy. Provisions which have had the most serious effect include the classification of large areas with no electrical potential as known geothermal resource areas, creation of known geothermal resource areas on the basis of overlapping lease applications, and acreage limitations of 20,480 acres per state, a 10-year readjustment period for lease terms, and the unrealistically high royalty on nonelectric projects, to name a few.

The problems which have resulted in the above-mentioned provisions of the act have been multiplied by the almost complete lack of access to federally managed lands in much of the West due primarily to the lack of priority given to geothermal leasing by the U.S. Forest Service.

I would like to emphasize that the statement Mr. Russell made indicating that the Secretary of the Interior had instructed that leases be granted as quickly as possible does not have a serious effect upon land managed by the U.S. Forest Service since they can effectively stifle geothermal leasing.

BLM, on the other hand, has been very responsive, much more responsive than the Forest Service. In Washington State, over 1 million acres have been applied for since 1974, and as of last Friday, approximately 7,000 acres have been leased. Our recent efforts to work with the U.S. Forest Service have failed and lease applicants have withdrawn their applications. After an extensive meeting which I had with the Bureau of Land Management and the U.S. Forest Service here in Washington, D.C. last October, we have received repeated promises as to when leases would be offered.

We held a meeting in Portland, Oreg. in May. Four hundred people attended that conference. The Forest Service was supposed to make an announcement at that time. They did not. The next time that they promised leases would be offered was on October 15. In talking to BLM last week, they have not agreed to lease any of that land as of that time.

In Oregon, between 60 and 80 lease applications are being held by the U.S. Geological Survey because the stipulations imposed by the U.S. Forest Service are unacceptable to that agency and the Department of the Interior, and until these stipulations are removed by the U.S. Forest Service the applications will not be processed.

We urge the committee to give careful consideration to the adoption of a time limit to processing of leases and permits. Such provisions are incorporated into S. 669 and in an appendix to my testimony. An increase in the acreage limitation to 51,200 acres as recommended by both bills is vital. The present limitation of 20,480 acres has severely limited the growth of the geothermal industry. There are simply not enough acreage available to mount an extensive exploration program.

[The prepared statements of Dr. Bloomquist follow:]

TESTIMONY OF

R. GORDON BLOOMQUIST, Ph.D.
GEOTHERMAL SPECIALIST

WASHINGTON STATE ENERGY OFFICE

BEFORE THE
SUBCOMMITTEE ON ENERGY
AND MINERAL RESOURCES
OF THE ENERGY AND NATURAL RESOURCES COMMITTEE

UNITED STATES SENATE

OCTOBER 27, 1981

Mr. Chairman, Members of the Committee,

My name is Dr. R. Gordon Bloomquist. I am a geologist with the Washington State Energy Office and I serve as Chairman of the Washington State Interagency Geothermal Development Council.

I am very pleased to have this opportunity to address the committee regarding S 669, the "Geothermal Steam Act Amendment of 1981," and S 1516, the "Geothermal Steam Act of 1981."

When I received information concerning today's hearing, I was not informed that both S 669 and S 1516 would be heard. Therefore, my written testimony, which you have before you, addresses only S 1516. However, many of the suggested changes which I have offered for the committee's consideration are contained in S 669.

The passage of legislation to amend the Geothermal Steam Act of 1970 at the earliest possible time is essential to the development of the nation's geothermal resources. Many of the original provisions of the Act have served to almost completely stifle the development of a viable geothermal industry. Provisions which have had the most serious effect include:

1. Classification of large areas with no electrical potential as KGRA's;
2. Creation of KGRA's on the basis of overlapping lease applications;
3. An acreage limitation of 20,480 acres per state;
4. A ten-year readjustment period for lease terms; and
5. An unrealistically high royalty on non-electric projects,

to name a few.

The problems which have resulted from the above mentioned provisions of the Act have been multiplied by the almost complete lack of access to Federally managed lands in much of the West. The lack of access is due primarily to the lack of priority given to geothermal leasing by the United States Forest Service.

In Washington State over 1,000,000 acres have been applied for and as of October 23, 1981, approximately 7,000 acres had been leased.

Our repeated efforts to work with the U.S. Forest Service have failed and lease applicants have withdrawn their applications. After extensive meetings which were held with the Bureau of Land Management and the U.S. Forest Service here in Washington, D.C., in October 1980, we have received repeated promises as to when lease offerings would be made, but after one year only three additional leases have been offered.

In Oregon, between 60 and 80 lease applications are being held by the United States Geological Survey because the stipulations imposed by the U.S. Forest Service are unacceptable and until these stipulations are modified or removed, the U.S.G.S. will not complete the processing.

We urge the committee to give careful consideration to the adoption of time limits for the processing of lease and permit applications. Such provisions are incorporated into S 669 and, in the Appendix to my written statement, I have offered additional language to accomplish this task.

Mr. Chairman, I am sure that we were all extremely pleased to hear Mr. Russell's comments this morning concerning Secretary Watt's move to increase geothermal leasing by the Department of Interior. However, the real barrier to geothermal leasing in Washington, Oregon, and to a large extent in Idaho and California, is not related to the Department of Interior, but instead to the United State Forest Service, Department of Agriculture. In fact, all of the lease applications in Washington State are on U.S. Forest Service administered lands. Secretary Watt's announcement makes it vital, therefore, that the Committee ensure that the same consideration be given to leasing by all agencies involved. This can be accomplished by setting time limits, as I have recommended, or through the adoption of Section 10 as presented in S 1516.

An increase in the acreage limitation to 51,200 acres, as recommended by both S 669 and S 1516, is vital. The present limitation of 20,480 acres has severely limited the growth of the geothermal industry. There is simply not enough acreage available to mount extensive exploration programs.

However, an increase in the acreage limitation will not serve its intended purpose if surface management agencies do not process lease applications in a reasonable manner and if adequate diligence requirements are not imposed upon industry to ensure that these areas are adequately explored. Diligence requirements such as those recommended in S 669 are highly desirable and, I feel, quite realistic.

The development of non-electric resources on Federal lands has been all but non-existent, mainly due to the royalty which would be assessed on such use. In fact, the 10-15 percent royalty has been such a deterent that according to the United States Geological Survey only one non-electric project presently utilizes geothermal resources from a Federal lease, and then the amount of resource used is so small that no royalty has actually been collected.

In 1979, Charles V. Higbee, of the Oregon Institute of Technology, testified to the Committee that in the case of the Klamath Falls, Oregon, district heating system, a ten percent royalty on the energy used would amount to 55.5 percent of the total operating cost of the system for the first year. Fortunately, there were resources available on non-Federal lands for this project. We support the reduction in royalty on direct use to 5-10 percent, but urge that no royalty be imposed on direct use projects until 1990 to allow this segment of the geothermal industry to become established.

We favor the issuance of free use permits as proposed by both bills, but urge the Committee not to exclude the use of such permits for farms or small businesses; S 669 would extend the free use permit to these entities.

We strongly favor the provision of S 669 which would set aside up to, but not exceeding, 10 percent of the acreage leased in any year for public bodies. This would serve to allow public bodies, especially utilities, to obtain an equity land position which might otherwise be unavailable to them because of their inability to place capital at risk. The ability of utilities to lease and develop geothermal resources for their own use should result in substantial savings to rate payers since the utilities will in this way have control over fuel prices.

Finally, Mr. Chairman, we urge the Committee to give very careful consideration to providing adequate protection for our nationally significant thermal manifestations in Yellowstone and Lassen Volcanic National Parks. We do not feel, however, that it is in the best interest of the nation to set arbitrary buffers around these areas which will prevent determining the extent of the resources which are available. We recommend instead that stringent monitoring procedures be developed and implemented by the lessee. We have drafted language to serve this purpose for the Committee's review in Appendix I.

Mr. Chairman, we have not commented on all of the provisions of the bills, choosing instead to concentrate on those aspects which we feel would provide the greatest benefit to the development of the geothermal resources of Washington State. We applaud the Committee's efforts and appreciate having been permitted to testify before the Committee. I'd be pleased to answer any questions or assist the Committee in any way.

STATEMENT OF
R. GORDON BLOOMQUIST PH.D.
GEOTHERMAL SPECIALIST
WASHINGTON STATE ENERGY OFFICE

Mr. Chairman, Members of the Committee:

My name is Dr. R. Gordon Bloomquist. I am a Geothermal Specialist with the Washington State Energy Office and I serve as Chairman of the Washington State Interagency Geothermal Development Council. I am very pleased to have this opportunity to address the committee on behalf of Governor Spellman of the state of Washington, regarding Senate Bill 1516, the "Geothermal Energy Act of 1981."

The passage of S 1516 is essential to the development of this nation's geothermal resources by the private sector. The lack of access to federally managed lands by the geothermal industry has been the greatest single barrier to geothermal development in Washington State and through much of the western United States.

As an example, since the passage of the Geothermal Steam Act in 1970, leases on over one million acres of United States Forest Service managed lands have been applied for in the state of Washington for geothermal exploration and development. To date, however, only 5,000+ acres have been leased.

The delays in leasing and permitting, caused by the low priority given to geothermal activities by the responsible surface management agencies, must be addressed through legislation. This legislation must establish reasonable time limits for the processing of leases and exploration and development permits and provide for Congressional review of the activities of these agencies. The development of geothermal resources on federally managed lands in Washington has been at a standstill because of the inaction of the surface management agencies involved, and our situation is not unique.

After waiting for federal leasing to begin in Washington since 1974, the situation became so critical in July of 1980 that the state was forced to request a complete moratorium on geothermal leasing on federally managed lands in the state. The request for a moratorium was made necessary by the actions of the United States Forest Service in the Gifford Pinchot National Forest. These actions resulted in 134 lease applications being withdrawn by the lease applicants or 45% of the leases on file in that forest. The withdrawals were prompted by lease offerings which were too small, non-contiguous, and too laden with surface activity restrictions to permit realistic exploration and development activities to proceed. Of the total 293 applications on file in the Gifford Pinchot National Forest, only two were approved, amounting to less than one percent of the total. Although the request for a moratorium was turned down, the Bureau of Land Management agreed on October 15, 1980 to reinstate all of the lease applications which had been withdrawn or rejected as a result of the actions of the United States Forest Service, and the United States Forest Service agreed to reconsider its geothermal leasing policy. In January 1981 the Regional Forester was directed by headquarters to adopt a much less protective geothermal leasing policy and to approve the issuance of leases at the earliest possible date. However, although eleven months have elapsed since the reinstatement of the lease applications, no additional leases have been issued.

The problems created by the lack of priority given to geothermal leasing by surface management agencies and the resulting delays in the preparation of the necessary environmental statements have been multiplied by provisions of the Geothermal Steam Act of 1970. These provisions discourage lease applicants from expending large sums of money for exploration when discovery would result in the rejection of the application and a reclassification of the area as a Known Geothermal Resource Area (KGRA), requiring competitive bidding. The problem is even further aggravated by classifying substantial areas without good geological evidence of electrical generation potential as KGRAs.

The lease limitation of 20,480 acres per state has resulted in serious problems for many of the more aggressive energy development companies which have been prevented from mounting active exploration programs in more than one or two areas per state. This problem, coupled to the almost total lack of leasing in some states, such as Washington, has served to severely restrict the growth of the geothermal industry. Even in Washington many lease applicants would be at the 20,480 acre limitation as soon as leases became available and several others have applied for acreage in excess of the 20,480 limit in anticipation of an increase to the more realistic figure of 51,200 acres.

An increase in the acreage limitation, however, will only serve its intended purpose if lease and permit applications receive timely processing by the responsible agencies and adequate diligence requirements are adopted to encourage exploration and development and to prevent large areas from being tied up solely for speculation.

We are extremely supportive of, and urge the committee to pass, the provisions of S 1516 which addresses the above problems, and we encourage the committee to give careful consideration to our recommendations concerning the adoption of time limits for the processing of lease and permit applications. We would also like to stress the need for more stringent diligence requirements, especially in light of the increase in acreage which will become available to individual applicants. We have drafted language for review by the committee (Appendix I - p 3, lines 8-27, and p 4, lines 1-27) which addresses these needs.

The majority of the geothermal resources discovered in the United States are and will continue to be low temperature and they will be utilized primarily to supply energy for space heating and agricultural and industrial processing. However, direct use geothermal applications are often marginally economical. Few if any of the projects now on line would show a profit if the resources were on federally managed lands and a ten percent royalty was imposed. In fact, the ten percent royalty has been such a deterrent to development, that, according to the United States Geological Survey, only one direct use project presently utilizes geothermal resources from a federal lease, and then the amount of resource used is so small that no royalty has actually been collected.

Charles V. Higbee testified to the Committee in 1979 that, in the case of the Klamath Falls, Oregon district heating system, a ten percent royalty on the energy used would amount to 55.5 percent of the total operating cost of the system for the first year.

We strongly support the provisions of S 1516 which lower the royalty charged on non-electric utilization and urge the Committee to give careful consideration to eliminating entirely such royalities on non-electric utilization until 1990 (see Appendix I - p 1, lines 6-12). This would remove a serious economic barrier and would most certainly expedite the development of the nation's low temperature geothermal resources with little or no lost revenue to the federal government.

We favor the issuance of free use permits as proposed in the Bill. This will serve as a further encouragement to the developer of low temperature geothermal resources. However, we feel that the use of low temperature geothermal resources for a farm or small business property by the surface owner or lawful occupant should not be excluded. We have recommended language to accomplish this for the Committee's review (Appendix I - p 2, lines 16-27, and p 3, lines 1-7). To require leasing and the collection of lease fees for such uses would not only serve to discourage such projects, but would almost surely cost the federal government more than it would receive, while providing no added protection to the resource or the large developer.

Providing adequate protection for the nationally significant thermal manifestations of Yellowstone and Lassen Volcanic National Parks has become an extremely important question. Both Senate Bill 669 and House Bill 4067 address this question in detail.

The state of Washington recognizes the desirability of providing protection to these as well as possibly other nationally significant thermal features. We do not, however, support the denial of leasing and exploration in areas surrounding these thermal manifestations. We would instead like to offer for the Committee's consideration a possible compromise (Appendix I - p 1, lines 13-29, and p 2, lines 1-15) which would allow for leasing but at the same time establish a buffer zone within which leasees are required to implement monitoring programs to detect adverse effects from exploration or energy production should they occur. If it is not possible to mitigate for such effects, exploration or production would have to be terminated.

Mr. Chairman, we have not commented on all of the provisions of the Bill, choosing instead to concentrate on those aspects which we feel would provide the greatest benefit to the development of geothermal resources in Washington State. We feel our recommendations would benefit the rest of the nation as well. We applaud the Committee's efforts and appreciate having been permitted to testify before your Committee.

APPENDIX I

SUGGESTED CHANGES TO S 1516

Sec. 6. Section 5(a) of the Act is amended to read as follows:

"(a) a royalty of not less than 10 per centum or more than 15 per centum in the case of electrical generation, and beginning not before January 1, 1990 a royalty of not less than 5 per centum or more than 10 per centum in the case of nonelectric utilization, of the amount or value, as utilized, of steam, heat, or other form of energy derived from production under the lease and sold or utilized by the lessee or reasonably susceptible to sale or utilization by the lessee.".

Sec. 10(A). The act is further amended by adding the following subsection after 15(c):

"(d)(1)(A) When the Secretary issues geothermal leases within a fifteen-mile-wide buffer zone around Yellowstone National Park, the leases shall be subject to modification under subparagraph (C).

"(B) When the Secretary issues geothermal leases within a one-mile-wide buffer zone along the southern border of Lassen Volcanic National Park, the leases shall be subject to modification under subpararagraph (C).

"(C) When the Secretary issues geothermal leases within the buffer zones established in subparagraphs (A) and (B), he shall require lessess to implement monitoring programs to detect any significant adverse effects on the nationally significant thermal features of Yellowstone or Lassen Volcanic National Parks. The Secretary may use information obtained through operation of such monitoring programs to modify the buffer zone established in subparagraph (A) around Yellowstone National Park and the buffer zone established in subparagraph (B) around Lassen Volcanic National Park. If at any time it is determined that exploration, development, or production activities on a lease within the buffer zones established in subparagraphs (A) and (B) are likely causing significant

5

adverse effects on any nationally significant thermal features within these parks, and mitigating actions are not possible, the Secretary shall immediately order a cessation of the activities causing the effects.".

"(2) Any action seeking judicial review of a decision of the Secretary pursuant to this subsection may only be brought within sixty days following the date the decision of the Secretary is announced and made public. Any action shall be barred unless a petition is filed within the time specified. Any such petition shall be filed in the appropriate United States district court. Notwithstanding the amount in controversy, such court shall have jurisdiction to determine such proceedings in accordance with the procedures hereinafter provided, and to provide appropriate relief. Any such proceeding shall be assigned for hearing at the earliest possible date, and shall have jurisdiction to grant any injunctive relief against the issuance of any permit, lease, or other authority pursuant to this Act except as a part of a final judgment entered in a case involving claim filed regarding this section.".

Sec. 11. Section 23 of the Act is amended by adding after subsection (b) the following:

"(c) Where the Secretary finds it in the public interest, the Secretary is authorized, ~~subject to section 15(c), to issue permits for the use of geothermal resources in lands administered by him for any noncommercial application without requiring a lease or compensation therefor. No such free use permit may be issued for the purpose of generating electricity in any amount.~~ and directed, pursuant to such regulations as he shall promulgate, to grant at no cost a permit for use of a geothermal resource to the surface owner or lawful occupant of lands subject to this Act, if the use of the geothermal resource is directed by such person in a residence, farm, or small business property, does not involve any generation of electricity, does not involve sale of the resource in commerce, does not involve commercial development of the resource, and involves only relatively small quantities of such resource. The use of the geothermal resource pursuant to such a permit shall not be inconsistent with any lease issued pursuant to this Act prior to the grant of the permit. Any lease issued subsequent to the grant of such permit shall, to the maximum extent practicable, not be inconsistent with such permit. The granting of a permit pursuant to this section shall not be subject to the requirements of section 102(2)(C) of the National Environmental Policy Act".

Sec. 11(A). Section 24 is amended by designating the present provisions as subsection (a) redesignating (a), (b), (c), (d), (e), (f), (g), (h), and (i), as (i), (ii), (iii), (iv), (v), (vi), (vii), (viii), and (ix), and by adding the following:

"(b) The Secretary shall make a decision on any lease application within one hundred eighty days after the filing of such application.

"(c) The Secretary shall make a decision on any permit to conduct drilling of exploratory or development wells within ninety days after the filing of such applications. The Secretary shall make a decision on a complete application to conduct development activities within one hundred eighty days of application.

"(d) The Secretary may for good cause extend the period for a decision on any permit or lease application for an additional period determined to be reasonable in specific cases, but not to exceed ninety days. If the need for such an extension is anticipated, the Secretary shall notify, in writing, the applicant and the Governor of the state within which the application was filed, a minimum of thirty days before the expiration of the inital time period, indicating the reason for the extension and the projected time to complete action on the application. In the event of any such extension—

(i) the payment of rental shall be suspended for the period of the extension; and

(ii) the running time of the lease shall be suspended for the ninety days or one hundred eighty days, as the case may be, plus the period of the extension.

(iii) the Secretary shall be required to report annually to congress on all applications where timelines were not met or where a negative decision was rendered, stating the reason for not meeting such timelines or reason for a negative decison.

Suspensions as established in subparagraphs (i) and (ii) shall not include any delay resulting from a failure on the part of the applicant to satisfy the requirements for an application.

"(e) A lease application shall be reviewed and an initial report prepared and forwarded to the lease applicant within sixty days of the filing, indicating the results of the initial review, what disposition is proposed, and the projected time to complete action on the application.

"(f) A permit application, pursuant to a lease, shall be reviewed and an initial report prepared and forwarded to the leasee within sixty days of filing, indicating the results of the review, what disposition is proposed, and the projected time to complete action on the application.

"(g) The Secretary shall establish requirements for diligent operations which shall require that a plan of operations for exploration shall be filed within three years of the issuance of a lease. The diligence requirements shall also provide that drilling commence no later than two years after the approval of such plans or two years after a drilling permit has been approved, whichever is later, or the lease shall be terminated by the Secretary. The Secretary may provide for the aggregation of diligence requirements on lease tracts within a geothermal prospect. The running time of the diligence requirements established in this subsection shall be suspended for periods of unreasonable delay caused by a lessee's inability to obtain state or Federal permits (with the exception of permits issued by the Department of the Interior) through no fault of the Department.".

Senator **Warner**. Mr. Bloomquist, we will have to ask you to stop now in order to give the others time. We apologize for this. It is totally unexpected and we are doing the very best we can under these extraordinary conditions.

We now go to Mr. Wilson, vice president and general representative of the Geothermal Division of Union Oil Co. of California.

STATEMENT OF JOSEPH L. WILSON, VICE PRESIDENT AND GENERAL REPRESENTATIVE, UNION GEOTHERMAL DIVISION, UNION OIL CO. OF CALIFORNIA

Mr. **Wilson**. Thank you, sir. I would like to touch briefly on some of the history since 1970 when the Geothermal Steam Act was passed and discuss why the industry hasn't grown to the extent that we all hoped. It has been very disappointing to us. Even though we are, without any great modesty, the leader in the geothermal development, we need more competition. We need more people. We need more entries into the geothermal industry, more wells drilled and more technical research and development work performed.

The reason that hasn't taken place is because of the small acreage limitation. That has kept out the small entrepreneur, independent operator, promoter, whatever you would like to refer to them as. They just simply do not, are not able to assemble large blocks of land, bring them to other companies, make deals. Where many wells are drilled in the oil industry in this regard, they just aren't drilled in the geothermal industry because of the low chargeability.

When you consider that 20,480 acres for this new industry that is trying to get off the land versus 246,080 acres for oil and gas, it is 10 times less or more. Oil and gas has been operating quite well for years and years under that limitation. Certainly with the vast geothermal resources under the Federal lands that are available, you have an interminable time for these lands to be developed under a 20,480-acre limitation.

Also companies do not want to join in the building of a geothermal division because of the quality of people that are required, the technical expertise that is necessary. You build the big organization. You are ready to explore. With the acreage limitation, you are shut down. You have no base for them to go to work. It is a waste of both talent and money. Therefore, that is one of the big reasons. If we could expand that acreage limitation which I don't believe anyone objects to, it would be a great help to all of us.

Congressman Clausen's amendment I would like to discuss just a moment. I am very familiar with the problem, Congressman. Our company is the operator of the geothermal field at the Geysers. We drill the wells, transmit the energy to P.G. & E. who then markets the power. We have made arrangements with every one of our land owners, and we have considerable land under lease that are subject to the 1916 Homestead Act at private negotiations without any problem.

I don't think it is necessary to have this specific preferential treatment to a small group of people. If reasonable people negotiate, mutually satisfactory terms can be arrived at, as has been going on in the oil industry since 1960. There are many lands in the oil industry which are subject to the same type of thing.

We feel that the KGRA definition is a necessary change. It was due to regulatory interpretation rather than statute, but we feel the statute is the necessary thing.

As to 669, there are a few features that we find rather not acceptable. We do not think it is necessary at this time to have a nonbonus type of bidding for geothermal. We don't believe that there is a necessity to change the regulations from a diligent exploration as now exists to a required drilling requirement to drill a well within 5 years.

Therefore, we support 1516 over 669 because of those things, and also the parks—I'm sorry—I almost failed on the parks.

As has been mentioned here, and as was mentioned in Congressman Clausen's hearing on H.R. 4067, the Chief of the Park Service stated that he did not see any necessity beyond Yellowstone and Lassen National Park to have any special provisions as to protecting of the national parks, and their thermal features. He felt that existing laws, rules, regulations, and the environmental statements would take care of that, and we certainly agree.

However, we will be realistic about this, and we would accept, as has been suggested by Congressman Clausen in H.R. 4067, a provision regarding Yellowstone and Lassen National Park even though we don't feel that it is necessary. We feel that any expansion beyond that, to take in all of the national parks' natural features, thermal features that exist through the Western United States would pretty well preclude any further development of geothermal in those States simply because we are now exploring geothermal similar to the way the oil and gas industry explored for oil and gas at the turn of the century where they looked for salt domes and oil seeps. We are now looking for geysers, fumerals, hot springs, and that type of thing.

Senator Wallop [presiding]. Mr. Wilson, again we have the same problem. Anybody can expand on their testimony that they have offered, and we will seek further comments.

Mr. Wilson. Again I would like to say that we support S. 1516.

[The prepared statement of Mr. Wilson follows:]

STATEMENT OF JOSEPH L. WILSON
VICE PRESIDENT AND GENERAL REPRESENTATIVE
UNION GEOTHERMAL DIVISION
UNION OIL COMPANY OF CALIFORNIA
BEFORE THE
SENATE SUBCOMMITTEE FOR ENERGY AND MINERAL RESOURCES
OF THE SENATE ENERGY AND NATURAL RESOURCE COMMITTEE
WASHINGTON, D.C.
OCTOBER 27, 1981

My name is Joe Wilson. I am Vice President and General Representative of the Union Geothermal Division, Union Oil Company of California. I am here today to support and urge the rapid enactment of legislation which will promote the development of geothermal energy.

I have thoroughly studied both S. 669 and S. 1516 but before commenting on them, I should like to present a few facts about the potential of geothermal energy, the contributions it can make to our Nation's energy requirements, and Union Oil Company's efforts in this regard.

On a nationwide scale, experts believe that there is a geological opportunity to produce enough geothermal energy to supply 20,000 mega-watts, (MW), of generating capacity in the next two decades; this is equivalent to about 700,000 barrels of oil per day, or 8.5 percent of today's crude oil production in the United States. As technological advances are made, there is the potential for several times this capacity in succeeding decades. For instance, this Nation's major geothermal development is the Geysers project in Sonoma County, California, the largest geothermal project in the world. Its development began in 1957, and, although initial developments were slow, today enough steam is produced to power a generating capacity of approximately 1,000 MW. This is sufficient to supply all the electrical requirements of a typical city of over one million people. Such generating capacity will result in a savings of over 10.7 million barrels of low sulphur fuel oil per year, which will not be needed to generate electricity, and a foreign exchange savings of hundreds of millions of dollars each year by reducing oil imports by that amount. Continued expansion is taking place at the Geysers field and ultimate capacity is now estimated to be about 2,000 MW.

Union Oil Company has long been a leader in the geothermal industry. We are responsible for approximately 1,300 MW of generating capacity worldwide and have an additional 330 MW under construction. We are actively engaged in other projects here in the United States and abroad.

In the United States at Brawley, in the Imperial Valley of southeastern California, Union Oil and Southern California Edison have begun a project where we produce geothermal energy from the Valley's highly saline geothermal fluids to power a 10 MW generating plant. This plant is the first in a series which could eventually supply geothermal energy to generate 460 MW of power for the Edison Company. The Imperial Valley has often been called the Saudi Arabia of the world's geothermal resources because of its vast potential. Success with the initial Brawley endeavor will augur well for a stronger geothermal role in electrical generation in this fast-growing populous section of the United States.

In addition, we currently have active or planned exploration activity in Idaho, Utah, California, New Mexico, Oregon, and Nevada. Union Oil Company has a historically strong dedication to geothermal energy, and we are active in maximizing its potential.

With respect to S. 669 and S. 1516, the most important provision in any legislation to promote the development of geothermal energy in the United States, is the necessity to increase the acreage limitations. A change in the definition of a Known Geothermal Resources Area (KGRA), to base it upon geological evidence rather than economic speculation, is also helpful. Both bills under consideration contain these provisions.

First, with regard to the acreage increase, the small amount of acreage operators are currently allowed to hold severely restricts the development of geothermal resources in the western United States. This becomes quite apparent when one considers that the United States Geological Survey has designated 3.4 million acreas as Known Geothermal Resource Areas (KGRA) and over 100 million acreas as Areas Valuable Prospectively (AVP). If we are held to the current 20,480 acres per state, it will take an interminable time for the industry to explore and develop these lands.

The areas considered geologically most promising for geothermal development are the eleven western states, which are also the states where the Federal Government owns the bulk of the land. If acreage from these lands, which is available for prospecting, is not increased, the development of the Nation's geothermal resources will indeed be slow.

The geothermal industry requires highly skilled technical personnel to explore and develop this unique resource. The restrictive acreage limitation severely handicaps the successful operator since two discoveries in a state effectively eliminate a company from additional exploration. Therefore, once a skilled group of technical personnel are trained, there are insufficient resources to allow them to continue an orderly progression of exploration and development. This is not an effective use of skilled manpower and wastes valuable assets. In fact, in some areas, we and other companies have approached the acreage limit and will have to slow down development. This is indeed tragic since we have a proven alternate energy resource which can safely be more expeditiously developed without massive government assistance, yet we are restricted in doing so.

Even the original Geothermal Steam Act of 1970 recognized that 20,480 acreas could be too restrictive; and, upon certain findings by the Secretary of Interior, provided for an increase to 51,200 acres fifteen years after the date of the Act. In view of the Nation's energy supply, experience with the present restriction, and current methods of operation, we strongly support the immediate increase of the acreage limitation.

We also support the definitional change for KGRAs. It makes good sense to base the KGRA decision on geologic evidence rather than economic speculation. This change will benefit the cost-sensitive geothermal industry by eliminating the up-front costs of competitive leasing in those areas where no sound justification for a KGRA designation exists. It also has the advantage of proving leases through drilling, thereby ultimately benefiting the public. Drilling leads to resource development which in turn helps conserve fossil fuel resources.

As noted, both bills are similar with respect to the two provisions just discussed. However, S. 669 contains provisions, which may be useful in other fields of energy development; but, because of the uniqueness of geothermal resources and their development, these provisions are counterproductive when applied to geothermal leasing.

While non-cash bonus bidding, mentioned in section 107 of S. 669, is applicable to some oil and gas leasing, geothermal leases and geothermal development are significantly different in their development to the extent that such a provision would deter rather than promote the development of geothermal energy. For example, when one discovers an oil or gas well, he instantaneously has a valuable asset, which he can use to promote further capital and additional development, and the returns may be immediate. However, in the geothermal area, it takes many years between the discovery of one geothermal well and the ability to realize income as a result of the discovery. In fact, numerous wells, a proven resource, and a sales contract with a utility take many years to develop and are necessary before one may realize a return on his investment. For this reason, non-cash bonus bidding encourages speculation rather than genuine developers.

The provisions of S. 669, section 124, requiring the Secretary of Interior to identify and publish a list of nationally significant geothermal features is unnecessary and tends to create more bureaucratic delay and red tape before geothermal resources can be developed. Existing environmental impact statements and environmental laws are completely adequate to prevent endangering any nationally or locally important geothermal features.

While we heartily support due diligence provisions for geothermal leases, the provisions of section 121 of S. 669, which require that a plan of operations shall be filed within 3 years and that drilling shall commence no later than 2 years after approval of such a plan, will require premature drilling and unnecessarily increase the cost of developing geothermal resources. Under the present system, there is much geophysical and other necessary constructive work which can take place during the 10 year period and which will still allow for appropriate and efficient drilling in a timely manner. In effect, the proposed provision changes what is presently a 10 year development period into a 5 year drilling requirement and requires that a well be drilled within 5 years regardless of the circumstances or the extent of development and knowledge concerning the resources. It does not ensure that overall development will be done more efficiently or expeditously.

While we can see the merit of Section 120 of S. 669, which authorizes the Secretary to grant no-cost permits for the use of geotheral resources to the surface owner; we can envision that without careful qualifications and protections, both with respect to the leasee and the surface owner, this provision could impede the development of geothermal resources and might create unforeseen and unintended liabilities.

We do support the provision in Section 116 of S. 669 which increases from 10 to 20 years the interval between lease negotiations. This provision will provide greater access to the capital markets, provide stability, and assist in acquiring capital.

I have not commented on all the provisions of both bills, but have only discussed some of the most significant ones. Although both bills contain the most important provision of all, the acreage increase, for the reasons previously outlined, we support S. 1516 as opposed to S. 669.

Mr. Chairman, I appreciate the opportunity to appear before the committee and express our views. I applaud the committee's continuing efforts to assist in promoting the development of our nation's geothermal resources. If we can be of assistance in this regard, we will be happy to do so, and I will be pleased to attempt to answer any questions that you might have.

Senator WALLOP. Next, Mr. Buchwald.

STATEMENT OF RUDY BUCHWALD, VICE PRESIDENT, GEOTHERMAL OPERATIONS, SUNOCO ENERGY DEVELOPMENT CO., ACCOMPANIED BY FRED CRAFT, MANAGER, EXTERNAL AFFAIRS, SUNOCO ENERGY DEVELOPMENT CO.; AND RICHARD BLISS

Mr. BUCHWALD. Thank you. I also have with me Mr. Fred Craft and Richard Bliss.

Senator WALLOP. Fred Craft is not unknown to this committee.

Mr. BUCHWALD. I would like to emphasize a few points. Rarely has development of a new industry been so completely dependent upon a single legislative initiative by the Congress. For at least the past 4 years contraints resulting from Federal legislative and regulatory policy affecting geothermal leasing have been identified as major inhibitions to the commitment of capital necessary to make development of geothermal energy competitive with other energy sources.

Under your leadership and the leadership of the members of this committee, legislative removal of these constraints was at hand in the last Congress but slipped away not because of controversy on the merits but rather because of political realities.

The industry is truly at a turning point. Because of its site-specific nature, geothermal depends upon the location and confirmation of relatively large bodies of surface water heated by the Earth's interior.

Senator WALLOP. Could you pull that microphone down slightly?

Mr. BUCHWALD. Is that better?

Senator WALLOP. Yes, sir.

Mr. BUCHWALD. Thank you. While the geologic conditions resulting in geothermal reservoirs are not rare, the combination of conditions which make geothermal viably competitive with alternative fuel sources are far from common. Inducing private industry to make the capital commitment and assume the risk necessary to develop a geothermal reservoir once located demands that the potential return be at least as attractive as the potential alternative investments.

In summary, Mr. Chairman, we cannot emphasize enough our view that if geothermal energy is to make a meaningful contribution to providing energy security to the United States, this bill must be enacted quickly into law.

Every week that goes by without resolution of the issues addressed by this legislation, interest in geothermal by those entities capable and willing to commit the capital necessary for development on a meaningful scale wane. We sincerely hope that the temptation for political posturing on this issue is resisted, and that this measure does not get held over and risk being considered in a politically charged election year.

Mr. Craft would also like to make a comment.

[The prepared statement of Mr. Buchwald follows:]

STATEMENT OF

RUDY BUCHWALD
VICE PRESIDENT, GEOTHERMAL OPERATIONS
SUNOCO ENERGY DEVELOPMENT CO. (SUNEDCO)

Mr. Chairman, my name is Rudy Buchwald. I am Vice President of Geothermal Operations for Sunedco, a subsidiary of the Sun Company. Sunedco is active in exploration for and development of a number of energy resources including coal, uranium, oil shale and of course, geothermal. Sunedco holds geothermal leases in a number of western states and has been very active in exploration for and definition of "geothermal reservoirs" over the past several years.

Rarely has development of a new industry been so completely dependent upon a single legislative initiative by the Congress. For at least the past four years constraints resulting from Federal legislative and regulatory policy affecting geothermal leasing have been identified as major inhibitions to the commitment of capital necessary to make development of geothermal energy competitive with other energy sources. Under your leadership and the leadership of other Members of this Committee, legislative removal of these constraints was at hand in the last Congress, but slipped away not because of controversy on the merits, but rather because of poliical realities.

As the first session of the 97th Congress enters its literal and figurative autumn, once again we have the opportunity to meet this challenge and provide the legal and regulatory framework to make development of geothermal resources viable. We sincerely hope that yet another year does not slip by without final Congressional action on this measure.

The industry is truly at a turning point. Because of its site specific nature, geothermal depends upon the location and confirmation of relatively large bodies of subsurface water heated by the earth's interior. While the geologic conditions resulting in geothermal reservoirs are not rare, the combination of conditions which can make geothermal viably competitive with alternative fuel sources is far from common. Inducing private entities to make the capital commitment and assume the risks necessary to develop a geothermal reservoir once located, demands that the potential return be at least as attractive as potential alternative investments.

Utilization of geothermal energy offers many obvious benefits to the public and the nation as a whole. Every BTU of geothermal energy which is utilized for electric generation or direct heat use is a BTU of other energy resources that can be conserved. This is obviously most beneficial when it replaces imported oil, which would be the immediate result in many areas of the West.

The environmental benefits which flow from geothermal utilization are obvious. As with any large industrial development, there are environmental concerns respecting geothermal, but when compared with what geothermal can replace, these concerns pale into relative insignificance. However, geothermal utilization brings into play a number of unique considerations. Exploitation of a geothermal reservoir can require a massive capital outlay just to prove the resource is there, and even greater capital outlay for construction of a facility to effectively utilize the heat. Where the intended use is for electrical generation, it also requires the "blending" of a non-regulated industry with a regulated industry, the only real substantial market for the product of the resource.

Since the market is regulated, the "value" of that product must favorably compete with alternative sources of electric generation available to that market. Hence, geothermal must compete, depending of course on the geographical area, with nuclear, coal, oil, or gas. In determining whether geothermal can favorably compete, the law (Public Utility Regulatory Policies Act) speaks in terms of meeting a utility's "avoided costs". Profitable exploitation of a geothermal reservoir at a utility's "avoided costs" (excluding "Geysers") has yet to be commercially demonstrated. We think it can be done, but only if the scale of such development (i.e., the land base available for exploration and development) is commensurate with the risks involved.

This brings us to the specific provisions of this bill which are generally considered by the industry as having prime importance if geothermal is ever to realize its potential:

1) Increasing the acreage available for leasing from 20,400 to 51,200 per company per state. This is an absolutely necessary change if the private sector is to be induced to commit the necessary capital and to maintain exploration and development teams in the field. Under existing law, the entire acreage available to a company in one state could be consumed by a single prospect which may or may not ultimately prove commercially viable.

2) Elimination of the "competitive interest" basis for classification of "known geothermal resource areas" (KGRA's). Under existing law if two or more entities file for a lease on the same area, that alone can result in the area being classified as a KGRA. This in turn requires that the area be subject to competitive bidding for leasing. Although there are those who argue that this procedure results in the maximum benefit

to the public through increased bonus bidding for geothermal leases, it acts as a tremendous disincentive to wildcat exploration in as yet unexplored areas. Any significant return to the Treasury from exploitation of geothermal resources on Federal lands will result from royalties on production, not from bonus bidding for leases.

3) Declassification of KGRA lands offered for lease sales but upon which no bids are received. It should be obvious that if an area is offered for lease under a competitive bidding system, and no bids are received, the next inducement to development of that particular area would be to offer it on a non-competitive basis. The purpose of the legislation is to induce development and production, not to raise revenue for the Federal government.

4) Protection of applicants for leasing of non-KGRA areas from bidding contests after redesignation of the area as a KGRA based on discoveries made by the original applicant. The bill would allow the discovering entity to meet the highest bid for such leases.

5) Relieving diligence requirements where a lessee can show commercial production, or a commitment to

construct a facility upon a lease or unit. The bill sensibly "forgives" further diligence requirements once commercial viability has been demonstrated. This helps make capital available for development of utilization facilities.

6) Administrative extension of a lease for up to ten years where construction of a facility or facilities has not been possible due to administrative delays beyond the control of the lessee or due to demonstrated marginal economics of a facility. The latter extension would only be available where substantial investment and development of the lease has been made. This provision recognizes that geothermal development is currently, and will be in its early stages, the victim of a host of unknowns -- from how much power companies can pay for power generated, to better means of defining the potential productive capacity and life span of the reservoir.

7) Extention of the renewal period for existing leases from 10 to a 20 year interval. This is an important change, especially in negotiating contracts with utilities which must make power requirement projections many years into the future.

There appears to be considerable controversy regarding the advisability of including a provision in this bill to protect the thermal features of national parks. One suggestion which has been advanced is to provide a buffer zone around certain national parks in which geothermal development would be prohibited or severely restricted. We believe that provisions of existing law adequately protect the thermal features of national parks. We recognize the popular appeal of being for protection of national parks. However, layering unnecessary statuatory restrictions will undoubtably result in controversy and protective overkill.

In order to develop a geothermal prospect one must first obtain a lease, file an environmental impact assessment, and obtain permits for actual development. If a significant thermal feature of a national park were jeopardized by such development, a permit would simply not be issued from the Department of the Interior.

In summary Mr. Chairman, we cannot emphasize enough our view that if geothermal energy is to make a meaningful contribution to providing energy security to the United States, this bill must be enacted quickly into law. Every week that goes by without resolution of the issues addressed by this legislation, interest in geothermal by those entities capable and willing to commit the capital necessary for development on a meaningful scale will wane. We sincerely hope that the temptation for political posturing on this issue is resisted and that this measure does not get held over and risk being considered in a politically charged election year.

We greatly appreciate this opportunity to express our views on this important matter and will answer any questions you or other Members of the Committee may have.

STATEMENT OF FRED CRAFT, MANAGER, EXTERNAL AFFAIRS, SUNOCO ENERGY DEVELOPMENT CO.

Mr. CRAFT. Thank you, Mr. Chairman. Three years ago I left this committee after having spent 7 years as a staff member, and I would like to add a perspective in terms of having gone from the committee where we drafted legislation and met necessary legislative relief in particular areas, and I joined a corporation that had the nonoil and gas, the developing as you will of energy sources, of geothermal, coal, uranium, and synthetic fuels.

What has happened basically, Mr. Chairman, is that the industry has been waiting with bated breath ever since the Federal Government, both in the executive branch and the legislative branch, identified the problems after the Arab embargo in 1973 to further development of geothermal.

There hasn't been a question. Everyone in this room understands what those problems are, but I want to point out to you that in all of the United States, there is not one commercial electric generation facility outside of the Geysers that is produced by geothermal. The corporations, and we are a subsidiary of a large corporation, we cannot compete internally in our organization for funds when we know that there is a deficiency, where we can't put that money to the best use.

I implore this committee and the Congress after last year—we thought we had it through. The Senate passed it. The House passed it. I don't believe honestly that there is any difference of opinion in this bill that is so pernicious or great that we can't overcome it in a conference or in some way.

The geothermal industry will not grow until this Congress recognizes that it has to pass this act, and we cannot compete internally to go out and do the job that the country needs and that we know can be done, and I want to add one other point. This has to do with technology.

The Geysers are steam dominated. Outside the Geyser area we are dealing with new technology, and we have to prove it, and we cannot prove it, Mr. Chairman, in another Arab embargo, or another interruption, or another emergency setting. We need to have the time to prove our technology with water-dominated types of problems that we can overcome, and we need to get on with the job, and I appreciate very much you having this hearing and moving this bill.

Senator WALLOP. Thank you very much. I might just add an old Yogi Berra line, that you can't think and hit at the same time which is particularly appropriate to energy matters, and now is the time to think, not at the time of an supply disruption. You make a lot of mistakes if that is all you have to do.

Next is Mr. Robert Wright.

STATEMENT OF ROBERT L. WRIGHT, LAND MANAGER, PHILLIPS PETROLEUM CO.

Mr. WRIGHT. Thank you for giving us the opportunity to appear here today and address Senate bill 1516. You have my written statement. We weren't aware that for the hearing record that S. 669 was going to be brought up, but we can comment verbally.

Senator WALLOP. As I pointed out, there will be an additional hearing on this, and the record will remain open, so if you care to comment on that, by all means.

Mr. WRIGHT. Both bills cover three things that we feel are very important and needed by the industry, and everyone summarized them previous to me.

It is acreage increase—we definitely need it. In an area like Nevada that is 86 percent Federal land, the 20,480 acres is just one prospect out there. We are totally shut down. My company has an option from the Southern Pacific Railroad. It is a checkerboard private land. We can't even develop it because of the checkerboard with Federal. We don't want to drill a well on the private land and get a discovery and have all the Federal go up for competitive bid and we would have to go to a sale against our competition, so it has even shut us down in some of the private lands.

The acreage increase, the KGRA redefinition, the review of the lease terms in 20 years instead of 10, those three things in both bills are good and we totally support them. When I say "we," I mean Phillips and the Western Oil & Gas Association supports those three items.

We do feel there are some problems with S. 669 that other people have discussed. One of the things that hasn't been mentioned is this set-aside for utilities. In S. 669 we talk about a 10-percent set-aside of acreage. Well, what is that 10 percent? If that is 10 percent of the best stuff that is coming up, why that is kind of bad for us.

We don't feel that the public utilities and other public bodies have the exploration staff, the geologists, the drilling expertise, necessary to develop the resources, and they shouldn't be passing that cost necessarily on to the ratepayers.

I also agree with the statement that Sun people made in that you are looking at an industry that has never gotten off the ground. The Union Oil Co. here is making money in the Geysers. The rest of us are chasing hot water prospects around the country. We don't know if it is going to work or not. We need every break that we can get, and the most important is the acreage increase.

I will be happy to answer questions.

[The prepared statement of Mr. Wright follows:]

STATEMENT OF R. L. WRIGHT
PHILLIPS PETROLEUM COMPANY
BEFORE THE
SENATE SUBCOMMITTEE ON ENERGY & MINERAL RESOURCES
OCTOBER 27, 1981

THANK YOU MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE FOR GIVING PHILLIPS THE OPPORTUNITY TO APPEAR TODAY TO ADDRESS SENATE BILL 1516, "THE GEOTHERMAL STEAM ACT OF 1981".

MY NAME IS BOB WRIGHT. I AM THE LAND MANAGER OF GEOTHERMAL OPERATIONS FOR PHILLIPS PETROLEUM COMPANY. TO FURTHER QUALIFY MYSELF AS A WITNESS ON THIS BILL, I HAVE HAD SOME THIRTY YEARS EXPERIENCE IN RESOURCE DEVELOPMENT ON PUBLIC LANDS COVERING OIL AND GAS, HARD ROCK MINERALS AND GEOTHERMAL RESOURCES. I HAVE DEALT WITH THE LEASING ASPECTS OF GEOTHERMAL ENERGY FOR THE PAST NINE YEARS. I ALSO PRESENTLY SERVE AS CHAIRMAN OF THE WESTERN OIL AND GAS ASSOCIATION'S GEOTHERMAL COMMITTEE. THE WOGA COMMITTEE IS COMPRISED OF SOME TWENTY (20) COMPANIES, LARGE AND SMALL, WHO ARE LEADERS IN THE EFFORT TO DEVELOP THIS NATION'S GEOTHERMAL RESOURCES AND IS THE ONLY MAJOR INDUSTRY COMMITTEE WHICH FOCUSES ON LEGISLATION, RULES AND REGULATIONS AFFECTING GEOTHERMAL DEVELOPMENT. MY COMMENTS HERE TODAY REFLECT THE FEELINGS OF NOT ONLY PHILLIPS BUT THE WESTERN OIL AND GAS ASSOCIATION GROUP AS WELL.

PHILLIPS GEOTHERMAL OPERATIONS ARE HEADQUARTERED IN SALT LAKE CITY WITH EXPLORATION AND/OR DEVELOPMENT ACTIVITIES IN MOST OF THE WESTERN STATES. WE ARE PRESENTLY DEVELOPING THE FIRST COMMERCIAL GEOTHERMAL PROJECT IN THE UNITED STATES TO BE LOCATED OUTSIDE OF THE STATE OF CALIFORNIA. OUR ROOSEVELT HOT SPRINGS

Project in Southwestern Utah will supply Utah Power and Light Company with steam for generating electricity as early as 1984. The project is located on Federal leases.

Phillips and WOGA endorse S. 1516, as introduced. We believe that the provisions of the bill will result in a more aggressive exploration and development program of geothermal resources on the public domain. One provision of the legislation which is especially needed by the geothermal industry is an increase in the Federal acreage allowed to be leased in any one state. S. 1516 provides for an increase from the present limitation of 20,480 acres to 51,200 acres that any one individual or corporation may hold per state. This acreage limitation was originally created to promote competition within the industry and to prevent speculative holdings. However, the limitation has actually hindered geothermal development.

The state acreage limitation has often resulted in forcing exploration companies to release what are believed to be good prospects in various states due to being at or near the acreage ceiling. This is particularly troublesome in that often, it takes more acreage than is allowed per state to accurately evaluate the commercial potential of a single prospect. Often the result is that a developer is limited to exploring and evaluating only one prospect per state when in fact there are many more areas that he would like to be and should be exploring. The State of Nevada, which contains some of the highest heat flow areas in the United States, is comprised of 86% Federal land. To limit exploration

IN THIS STATE TO ONE 20,480 ACRE PROSPECT IS UNREALISTIC. FEW PEOPLE ARE WILLING TO CONDUCT THE REGIONAL EVALUATION NECESSARY IN A SITUATION SUCH AS THIS IF THEIR OPPORTUNITIES ARE LIMITED TO ONE PROSPECT.

THE STATE ACREAGE LIMITATION TIED WITH THE PRIMARY LEASE TERM OF 10 YEARS CAUSES ANOTHER PROBLEM. THE TIME SPAN FROM LEASE APPLICATION TO ENERGY PRODUCTION IS SIX TO TWELVE YEARS DUE TO REGULATORY AND OTHER PROCESSES AND DELAYS. THE ACREAGE LIMITATION FREQUENTLY FORCES AN OPERATOR TO RELEASE LANDS FROM LEASE BEFORE EXPLORATION AND DEVELOPMENT CAN BE COMPLETED. A DEVELOPER IS FORCED TO MAKE SPECULATIVE JUDGEMENTS ON WHICH LANDS HAVE ENERGY PRODUCING POTENTIAL IN ORDER TO KEEP AN ACTIVE, INTEGRATED LEASING, EXPLORATION AND DEVELOPMENT PROGRAM UNDERWAY IN A STATE. THE TIME FRAME FOR GEOTHERMAL DEVELOPMENT IS OF FURTHER IMPORTANCE WHEN YOU TAKE INTO ACCOUNT THE STILL UNDEFINED GEOPHYSICAL CHARACTERISTICS OF MOST GEOTHERMAL RESOURCES AND THE ABSENCE OF PROVEN KNOWLEDGE OF RESOURCE REQUIREMENTS FOR THE ECONOMIC APPLICATION OF GEOTHERMAL ENERGY.

S. 1516 WOULD INCREASE THE STATE ACREAGE CEILING TO 51,000 ACRES, AN INCREASE WHICH IS WARRANTED IN VIEW OF THE LARGE ACREAGE NEEDED TO EVALUATE A PROSPECT. IN VIEW OF THE FACT THAT THERE IS ESTIMATED TO BE OVER 100 MILLION ACRES OF PUBLIC LAND AVAILABLE FOR GEOTHERMAL EXPLORATION, AND THAT THESE LANDS CONTAIN 60% OF THE ACREAGE POTENTIAL FOR GEOTHERMAL PRODUCTION, WE BELIEVE THAT SUCH AN INCREASE WILL ENHANCE COMPETITION WITHIN THE INDUSTRY BY INCREASING EXPLORATION ACTIVITIES BY LARGE AND SMALL COMPANIES

ALIKE. THE INCREASE IS FURTHER WARRANTED IN VIEW OF THE MUCH HIGHER ACREAGE CEILINGS SET FOR COMPETING RESOURCES SUCH AS OIL AND GAS WHICH HAS AN ALLOWABLE OF 246,080 ACRES PER STATE.

THE NEW LEGISLATION PERMITS THE SECRETARY, IN HIS DISCRETION, TO EXTEND THE PRIMARY TERM OF A GEOTHERMAL LEASE FOR AN ADDITIONAL 10 YEARS IF DEVELOPMENT HAS BEEN IMPAIRED THROUGH NO FAULT OF A LESSEE WHO HAS MADE SUBSTANTIAL INVESTMENT TOWARDS DEVELOPMENT.

S. 1516 ALSO ADDRESSES A PROBLEM OF GREAT CONCERN TO UTILITIES. UNDER PRESENT LAW, THE SECRETARY IS AUTHORIZED TO READJUST THE TERMS AND CONDITIONS OF ANY GEOTHERMAL LEASE EVERY TEN YEARS AFTER PRODUCTION BEGINS. UTILITIES FEAR THAT ARBITRARY AND UNFAIR ADJUSTMENTS MIGHT BE MADE TO LEASES AFTER THEY HAVE MADE MAJOR INVESTMENTS IN POWERPLANTS DEPENDENT UPON THE LEASED RESOURCES. S.1516 WOULD REMOVE THE UNCERTAINTY OF ADVERSE CHANGE BY RESTRICTING LEASE ADJUSTMENTS TO NOT LESS THAN 20 YEAR INTERVALS, THUS GIVING UTILITIES TIME TO AMORTIZE PLANT INVESTMENTS.

ANOTHER IMPORTANT CHANGE MADE BY THE PROPOSED LEGISLATION WOULD OCCUR IN REDEFINING A KNOWN GEOTHERMAL RESOURCE AREA. UNDER THE PRESENT LAW A KGRA CAN BE CREATED AND EXISTING LEASE APPLICATIONS CANCELLED IF A DISCOVERY IS MADE OF COMMERCIAL GEOTHERMAL RESOURCES IN A PARTICULAR AREA, OR IF TWO APPLICANTS FILE ON IDENTICAL ACREAGE DURING A THIRTY (30) DAY PERIOD.

MOST GEOTHERMAL PROSPECTS ARE A MIX OF FEDERAL AND NON-FEDERAL LANDS. THUS COMPANIES WITH APPLICATIONS PENDING WILL NOT EXPLORE ON NEARBY NON-FEDERAL LEASES FOR FEAR THAT ANY DISCOVERY WILL RESULT IN THE REJECTION OF THEIR APPLICATIONS.

S. 1516 CORRECTS THIS BY GIVING THE APPLICANT RESPONSIBLE FOR THE EXPLORATION RESULTING IN A KGRA DESIGNATION A NON-COMPETITIVE LEASE. IT ALSO GIVES OTHER PARTIES HOLDING LEASE APPLICATIONS IN THE AREA FOR A PERIOD OF ONE YEAR OR LONGER THE OPPORTUNITY TO MATCH THE HIGHEST COMPETITIVE BID FOR A PARCEL WHEN OFFERED.

WHILE THE LEGISLATION BEING CONSIDERED BY THIS COMMITTEE CONTAINS OTHER TECHNICAL PROVISIONS AND AMENDMENTS, WE BELIEVE THAT THE LEASING ASPECTS DISCUSSED ABOVE AND ADDRESSED IN THE BILL, COVER THE BULK OF THE EXPLORATION AND DEVELOPMENT PROBLEMS PRESENTLY CONFRONTING THE COMMERCIAL DEVELOPMENT OF GEOTHERMAL ENERGY. WITH THE PASSAGE OF S. 1516, YOU WOULD PROVIDE THE OPPORTUNITY FOR THE DEVELOPMENT OF A BROADER SCALE GEOTHERMAL INDUSTRY, BRINGING ON LINE IN MANY STATES A NEW ENERGY RESOURCE TO SUPPLEMENT OUR PRESENT DOMESTIC ENERGY MIX.

AGAIN, THANK YOU FOR EXTENDING AN INVITATION TO ALLOW US TO COMMENT ON THIS BILL SO IMPORTANT TO THE GEOTHERMAL INDUSTRY. I WOULD BE HAPPY TO RECEIVE ANY QUESTIONS WHICH THE COMMITTEE MIGHT HAVE.

Senator **Wallop**. Thank you very much, and I think in the interest of time again we will submit our questions to you, and further comments you would care to make about the other bills, we apologize for the shortness, but that was simply beyond the control of the committee.

Next is Mr. Sopher from the Wilderness Society.

STATEMENT OF TERRY SOPHER, THE WILDERNESS SOCIETY

Mr. **Sopher**. Thank you, Mr. Chairman. We appreciate this opportunity to briefly speak this morning. I know you understand that we cannot speak on behalf of all the other conservation organizations.

Senator **Wallop**. We do indeed understand that.

Mr. **Sopher**. We do have some——

Senator **Wallop**. Again, I would say that the opportunity to testify will exist. It is just that we ran into a technical thing this morning that was beyond our control.

Mr. **Sopher**. We do appreciate that, and we are eager for such an opportunity.

We do have certain major concerns that we believe can be resolved rather effectively in the bill, and we will be glad to work with the committee members to find acceptable language to accommodate these concerns.

Specifically, Mr. Chairman, there are three major areas of concern that we have—first, protection of the thermal features of the national park system.

We do not believe based on the analysis of our council and our respective organizations that existing authorities are strong enough to insure full protection of the thermal features of the national park system. We are gratified with the concern that you and Chairman Warner have expressed over Yellowstone Park.

We believe in addition that other members of the park system need language to protect them as well, so we would like to work with the committee to develop language that will accommodate these concerns.

Second, we are concerned about provisions of the bill that would in effect amend the Wilderness Act to allow geothermal development in the national wilderness preservation system. It was not the intent of the Wilderness Act that such areas would be open to geothermal development. We believe that they should not be opened to geothermal development because the type of development facilities are incompatible with preservation of the wilderness environment, and in recognition of the fact that our wilderness system composes only 3 percent of the national land area, we believe that this area should be protected and not gone into for development unless there is absolutely no alternative to the Nation.

The third area of concern, Mr. Chairman, has to do with the language that would specify that geothermal testing and exploration arrangements by BLM, wilderness study areas and Forest Service further planning areas, is considered not impairing. In both cases, we believe that language is unnecessary.

In the case of BLM, the existing Federal Land Policy and Management Act under the intermanagement policy for managing the study areas fully accommodates those concerns. Geothermal exploration is occurring under that intermanagement policy. There have been no cases according to BLM data that we obtained where geothermal exploration activites have been denied in those areas.

In the case of the Forest Service, the Forest Service current further planning area guidelines for the activities that can occur there provide that leasing can occur and that exploration can occur as well.

However, contrary to the BLM study areas, the Forest Service does not attach a stipulation to the leases that allows development to be precluded. We think it is important to maintain the opportunity for Congress to consider the wilderness option for study areas, that any leases issued must contain the stipulation that enables the Forest Service to prevent development until Congress has an opportunity at least to consider wilderness designation.

In summary, Mr. Chairman, we will be happy to appear again at a further hearing to further discuss these issues, and any questions you may have, and we look forward to an opportunity to assist in development as a result of these problems.

[The prepared statement of Mr. Sopher follows:]

THE WILDERNESS SOCIETY

FOUNDED IN 1935

SUMMARY STATEMENT

STATEMENT OF TERRY SOPHER, REPRESENTING THE WILDERNESS SOCIETY, BEFORE THE U.S. SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES, SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES, OCTOBER 27, 1981, ON S. 1516 AND S. 669.

Introduction

Mr. Chairman, I am Terry Sopher, a public lands specialist for The Wilderness Society. We are a national organization of 50,000 members dedicated to promoting sound multiple use management of the public lands for the long-term benefit of the Nation. We appreciate this opportunity to present testimony on aspects of S. 1516, the "Geothermal Steam Act of 1981," and S. 669, the "Geothermal Steam Act Amendments of 1981."

Mr. Chairman, we support the goal of promoting exploration and development of our Nation's geothermal resources. We agree that geothermal resources hold the potential for making a significant contribution to meeting our energy needs in an environmentally sound manner.

I will focus my oral testimony on concerns related to effects of the bills on the National Park System, the National Wilderness Preservation System, lands under wilderness study by the Bureau of Land Management, and further planning areas

1901 PENNSYLVANIA AVENUE, N.W., WASHINGTON, D.C. 20006

(202) 828-6600

UNDER THE U.S. FOREST SERVICE RARE II WILDERNESS REVIEW. WE WOULD APPRECIATE BEING ABLE TO SUBMIT MORE DETAILED TESTIMONY FOR THE RECORD.

GEOTHERMAL RESOURCES OF THE NATIONAL PARK SYSTEM

IT IS ESSENTIAL, MR. CHAIRMAN, THAT ANY BILL CONSIDERED BY THE CONGRESS INCLUDE STRONG SAFEGUARDS TO PRECLUDE ANY ADVERSE EFFECTS OF GEOTHERMAL LEASING ON OUR IRREPLACEABLE NATIONAL PARK SYSTEM.

SECTION 124 OF S. 669 HAS THE INTENT OF PRECLUDING GEOTHERMAL LEASING IN AREAS ADJACENT TO NATIONAL PARKS AND MONUMENTS WHERE SUCH LEASING COULD ADVERSELY AFFECT GEOTHERMAL RESOURCES IN THE PARKS AND MONUMENTS. S. 1516 HAS NO SUCH PROVISION.

WHILE WE SUPPORT THE GENERAL INTENT OF SECTION 124 OF S. 669, THE SPECIFIC LANGUAGE OF THE SECTION DOES NOT GO FAR ENOUGH TO ENSURE PROTECTION OF THOSE UNITS OF THE NATIONAL PARK SYSTEM WHICH HAVE GEOTHERMAL FEATURES.

WE RECOMMEND THE FOLLOWING SPECIFIC REVISIONS AND ADDITIONS TO THE LEGISLATION:

(1) TO REQUIRE THE SECRETARY OF THE INTERIOR TO DESIGNATE PROTECTIVE ZONES ADJACENT TO ALL NATIONAL PARK SYSTEM UNITS WHERE THERE ARE ANY KNOWN GEOTHERMAL FEATURES. THE ZONE WOULD BE DEFINED BASED ON STUDIES BY THE U.S. GEOLOGICAL SURVEY AND THE NATIONAL PARK SERVICE AND ESTABLISHED WIDE ENOUGH TO ENSURE PROTECTION OF GEOTHERMAL FEATURES IN THE PARK UNIT INVOLVED.

f 3 -

(2) To prohibit the Secretary from issuing leases in these protective zones unless he makes a finding based upon sound technical studies by the U.S. Geological Survey and National Park Service that there would be no adverse effect on geothermal features in the park system unit.

(3) to require that any leases issued in such a protective zone must contain a stipulation that exploration and/or production shall be totally precluded at any time it is determined that such activities may adversely impact park geothermal features.

(4) To require lease activities to be closely monitored by the U.S. Geological Survey and the National Park Service to detect potential adverse effects on units of the park system.

(5) To designate a "no leasing" zone around Yellowstone National Park that extends at least 20 miles from the park perimeter to include all of the Island Park caldera.

(6) To designate a "no leasing" zone that extends 5 miles from the perimeters of Lassen Volcanic National Park and Mount Ranier National Park.

(7) To prohibit Federal loans, grants or licenses for geothermal exploration or development in "no leasing" zones, in protective zones designated by the Secretary, or on non-Federal lands within units of the park system.

BLM Wilderness Study Areas and Forest Service RARE II "Further Planning Areas"

Section 13(a) of S. 1516 and Section 107(f) of S. 669 provide for geothermal testing and exploration in BLM wilderness study areas and in Forest Service RARE II "further planning" areas. Section 13(a) of S. 1516 also specifies that leases may be issued in these areas as well. There are important differences between the Forest Service and BLM wilderness reviews, so I will address them separately.

BLM Wilderness Study Areas

There is no need for any special language in the bill concerning geothermal leasing or exploration in BLM wilderness study areas. Consistent with the mandates of the Federal Land Policy and Management Act of 1976 (FLPMA), geothermal leases are issued in BLM wilderness study areas and geothermal exploration is permitted. Among other things, Section 603 of FLPMA specifies that study areas are to be managed so as not to impair wilderness values. BLM issued a detailed policy for managing these study areas consistent with FLPMA's mandates. This policy -- referred to as the "interim management policy" -- already fully provides for the purposes sought in your bill and S. 669:

- Study areas are open to issuance of new geothermal leases, and BLM has been issuing such leases. Up through 1980, the Bureau had issued a total of 134 leases in wilderness study areas and leases are continuing to be issued in response to applications. These leases are issued with a wilderness protection stipulation that makes it clear that exploration or production are permissible so long as they do not impair wilderness suitability of the study area. I have attached a copy of this stipulation language to my testimony.

- Geothermal exploration activities are specifically permissible under the interim management policy. The policy provides that exploratory drilling and even new temporary access roads may occur in WSA's so long as they do not permanently impair wilderness values. Bureau data indicate that all applications for geothermal exploration activities in wilderness study areas were approved under this policy.

Forest Service "Further Planning" Areas

The Wilderness Society opposes geothermal leasing in Forest Service further planning areas unless the leasing is conditioned to ensure full protection of the wilderness option for the area. Section 13(a) does NOT provide the necessary full protection and is thus unsatisfactory. Let me explain.

The Forest Service put many of the RARE II roadless areas into further planning because of the need for more minerals data, including geothermal potential, before making the recommendation for wilderness or nonwilderness. Some of the data about potential or lack of potential can be obtained through exploration by private parties holding geothermal leases. These data can contribute to a more informed allocation decision. However, unless carefully stipulated, geothermal leasing will pre-empt the opportunity for either the Forest Service or the Congress to decide that a further planning area should be preserved in perpetuity as wilderness. In our view, leases may be issued in further planning areas ONLY when accompanied by stipulations authorizing the Forest Service to deny exploration or production plans that have unacceptable impacts on wilderness character. Otherwise, if a lease by its terms guarantees full development rights, the wilderness preservation

OPTION BECOMES MEANINGLESS. IN THIS CASE, CONGRESS AS WELL IS DEPRIVED OF THE RIGHT TO STUDY AND POSSIBLY ADD AREAS AS UNITS OF THE WILDERNESS SYSTEM.

FOR LEASING TO BE USEFUL IN DATA-GATHERING WHILE NOT PRECLUDING WILDERNESS OPTIONS, THERE MUST BE STIPULATIONS AGREED TO BY THE LESSEE THAT AUTHORIZE THE FOREST SERVICE TO DENY EXPLORATION OR PRODUCTION ACTIVITIES THAT WOULD IMPAIR WILDERNESS VALUES. THE SO-CALLED "FURTHER PLANNING" STIPULATION CURRENTLY USED BY THE FOREST SERVICE IS NOT ADEQUATE; IT ALLOWS ONLY THE POSTPONEMENT, NOT THE DENIAL, OF DEVELOPMENTAL ACTIVITY. WHAT IS NEEDED INSTEAD IS A STIPULATION SIMILAR TO THAT DEVISED BY BLM (ATTACHED) WHICH CLEARLY ESTABLISHES THAT THERE ARE NO RIGHTS TO DEVELOP. UNDER SUCH LEASES, THE AGENCY RETAINS THE FULL OPTION TO RECOMMEND FOR WILDERNESS BECAUSE IT CAN TURN DOWN PLANS OF OPERATION THAT IMPAIR WILDERNESS CHARACTER.

ACCORDINGLY, WE STRONGLY RECOMMEND THAT THE BILL DIRECT THE FOREST SERVICE TO ISSUE GEOTHERMAL LEASES IN FURTHER PLANNING AREAS ONLY WITH A WILDERNESS PROTECTION STIPULATION OF THE NATURE USED FOR BLM WILDERNESS STUDY AREAS. THIS WILL ENSURE ADEQUATE OPPORTUNITY FOR EXPLORATION WHILE NOT PRECLUDING CONGRESS OF THE OPTION TO DESIGNATE WILDERNESS.

NATIONAL WILDERNESS PRESERVATION SYSTEM

SECTION 13(B) OF S. 1516 AMENDS THE WILDERNESS ACT OF 1964 TO OPEN THE NATIONAL FOREST WILDERNESS SYSTEM TO GEOTHERMAL LEASING AND DEVELOPMENT. WE STRONGLY OPPOSE THIS PROVISION OF THE BILL.

Geothermal development is inherently incompatible with preservation of wilderness values. If a wilderness area were opened to geothermal development, by definition, wilderness would cease to exist in light of the substantial facilities required for geothermal production. Furthermore, it is obvious that our national wilderness system could not make any significant contribution to geothermal energy production, even if there were evidence that any wilderness areas were likely to have real geothermal energy potential. The national forest wilderness system represents only 1 percent of our national land area. Surely, such a small amount of land base cannot be realistically assumed to be a significant source for meeting our Nation's energy needs. Finally, our national wilderness areas have been designated as such by Congress in recognition of their unique and irreplaceable natural, historical, scientific and ecological values. These areas should not be sacrificed for development unless we have no other alternative.

Accordingly, we recommend that the bill specifically provide that geothermal leasing is totally prohibited in units of the National Wilderness Preservation System.

Conclusion

Mr. Chairman, we appreciate your interest in our testimony on these important bills. We believe that action to accommodate the concerns we have identified will avoid unnecessary controversy and facilitate enactment of legislation to promote needed development of the Nation's geothermal resources.

APPENDIX A

WILDERNESS PROTECTION STIPULATION

By accepting this lease, the lessee acknowledges that the lands contained in this lease are being inventoried or evaluated for their wilderness potential by the Bureau of Land Management (BLM) under section 603 of the Federal Land Policy and Management Act of 1976, 90 Stat. 2743 (43 USC Sec. 1782), and that exploration or production activities which are not in conformity with section 603 may never be permitted. Expenditures in leases on which exploration drilling or production are not allowed will create no additional rights in the lease, and such leases will expire in accordance with law.

Activities will be permitted under the lease so long as BLM determines they will not impair wilderness suitability. This will be the case either until the BLM wilderness inventory process has resulted in a final wilderness inventory decision that an area lacks wilderness characteristics, or in the case of a wilderness study area until Congress has decided not to designate the lands included within this lease as wilderness. Activities will be considered nonimpairing if the BLM determines that they meet each of the following three criteria:

(a) It is temporary. This means that the use or activity may continue until the time when it must be terminated in order to meet the reclamation requirement of paragraphs (b) and (c) below. A temporary use that creates no new surface disturbance may continue unless Congress designates the area as wilderness, so long as it can easily and immediately be terminated at that time, if necessary to management of the area as wilderness.

(b) Any temporary impacts caused by the activity must, at a minimum, be capable of being reclaimed to a condition of being substantially unnoticeable in the wilderness study area (or inventory unit) as a whole by the time the Secretary of the Interior is scheduled to send his recommendations on that area to the President, and the operator will be required to reclaim the impacts to that standard by that date. If the wilderness study is postponed, the reclamation deadline will be extended accordingly. If the wilderness study is accelerated, the reclamation deadline will not be changed. A full schedule of wilderness studies will be developed by the Department upon completion of the intensive wilderness inventory. In the meantime, in areas not yet scheduled for wilderness study, the reclamation will be scheduled for completion within 4 years after approval of the activity. (Obviously, if and when the Interim Management Policy ceases to apply to an inventory unit dropped from wilderness review following a final wilderness inventory decision of the BLM State Director, the reclamation deadline previously specified will cease to apply.) The Secretary's schedule for transmitting his recommendations to the President will not be changed as a result of any unexpected inability to complete the reclamation by the specified date, and such inability will not constrain the Secretary's recommendation with respect to the area's suitability or nonsuitability for preservation as wilderness.

The reclamation will, to the extent practicable, be done while the activity is in progress. Reclamation will include the complete recontouring of all cuts and fills to blend with the natural topography, the replacement of topsoil, and the restoration of plant cover at least to the point where natural succession is occurring. Plant cover will be restored by means of reseeding or replanting, using species previously occurring in the area. If necessary, irrigation will be required. The reclamation schedule will be based on conservative assumptions with regard to growing conditions, so as to ensure that the reclamation will be complete, and the impacts will be substantially unnoticeable in the area as a whole, by the time the Secretary is scheduled to send his recommendations to the President. ("Substantially unnoticeable" is defined in Appendix F of the *Interim Management Policy and Guidelines for Lands under Wilderness Review.*)

(c) When the activity is terminated, and after any needed reclamation is complete, the area's wilderness values must not have been degraded so far, compared with the area's values for other purposes, as to significantly constrain the Secretary's recommendation with respect to the area's suitability or nonsuitability for preservation as wilderness. The wilderness values to be considered are those mentioned in section 2(c) of the Wilderness Act, including naturalness, outstanding opportunities for solitude or for primitive and unconfined recreation, and ecological, geological or other features of scientific, educational, scenic, or historical value.

If all or any part of the area included within the leasehold estate is formally designated by Congress as wilderness, exploration and development operations taking place or to take place on that part of the lease will remain subject to the requirements of this stipulation, except as modified by the Act of Congress designating the land as wilderness. If Congress does not specify in such act how existing leases like this one will be managed, then the provisions of the Wilderness Act of 1964 will apply, as implemented by rules and regulations promulgated by the Department of the Interior.

SOURCE: Bureau of Land Management, Interim Management Policy and Guidelines for Lands Under Wilderness Review, December 12, 1979, pp. 27-28.

Senator **Wallop**. Thank you very much, Mr. Sopher. We have precisely 5 minutes left, if Mr. Jarvis would care to make a comment on behalf of the National Park Association, if he is still here, and again, under the same circumstances.

STATEMENT OF T. DESTRY JARVIS, DIRECTOR OF FEDERAL ACTIVITIES, NATIONAL PARKS AND CONSERVATION ASSOCIATION

Mr. **Jarvis**. Thank you, Mr. Chairman. I would like to expand on the statement that Mr. Sopher made with regard to the need for protection of the national park system.

It seems to us that there are two areas of concern here that the committee needs to address, and we would also be happy to work with the committee to try to accommodate those.

One is that the national park system is an entity that should be considered as a true system. I don't think that we can distinguish between the values of a thermal feature that happens to occur in Hot Springs, or Lake Meade, or Yukon Charlie in Alaska as contrasted with those that may occur in Lassen, and Yellowstone, and others just because one area is better known than another.

All the units of the park system that have been added to the park system are governed by the Organic Act of 1916, and we believe that protective language to assure perpetuation of those features should apply to all units of the park system equally.

The language in S. 669 that relates to designation of a geographic zone around the parks is appropriate. We strongly support that. We would like to see, of course, it extended to all the units of the park system, and I should point out that that does not mean that in every case there will be a zone around every park.

In the case of the larger parks in Alaska, for example, it is entirely conceivable that the zone would correspond with the boundary since those parks are large and the boundaries were drawn on more of an ecological line, and in the case of Yellowstone which you are very familiar with, Senator Wallop, there is evidence that the potential exists.

I think one of the reports talks in terms of the likelihood of the existence of at least a hydrological connection between the thermal features of Yellowstone and those outside the park. It is apparent or it seems to be the case that there are separate sources, but the bedrock is below the level at which the hydrologic transfer of fluid flow would move between the two areas, and so it is likely, according to the research completed this summer by some scientists from the University of Utah, that there is an interconnection between those two.

Senator **Wallop**. The report calls it likely. I think it refers to it as an implication.

Mr. **Jarvis**. That may very well be, Senator. I do think, however, that we need to pay special attention to those possibilities and that leasing not occur in those kinds of sensitive areas.

I would hope that the potential for geothermal energy development in this country is greater than what can be found around the national parks. If it isn't, then we won't have much benefit from geothermal energy if those are the only places that the sources occur. I am aware that it isn't in California, and certain places in the State are already producing geothermal energy commercially. We encourage that. It is, as others have said, a potential source of energy. How abundant remains to be seen, but we do need to protect the national parks as an overiding, I would say overriding national concern in addition to the need to develop geothermal.

There are several other points that should be emphasized.

Senator **WALLOP**. We have a legal 1 minute.

Mr. **JARVIS**. That's fine. If leases are to occur in the geographic zones around national parks, we would like to see them not be permitted until the zones have been designated. That is not taken care of in the language now in S. 669.

It seems a minor point, but we would like to see the work done to designate those zones before leasing can occur in those zones.

I think those are the major points that I would like to speak to today.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Jarvis follows:]

STATEMENT OF T. DESTRY JARVIS
DIRECTOR OF FEDERAL ACTIVITIES
NATIONAL PARKS & CONSERVATION ASSOCIATION

BEFORE THE
SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES

ON S. 669 and S. 1516,
AMENDMENTS TO THE GEOTHERMAL STEAM ACT OF 1970
October 27, 1981

Mr. Chairman and other distinguished Members of the Subcommittee:

I am T. Destry Jarvis, Director of Federal Activities, with the National Park and Conservation Association. On behalf of NPCA's 35,000 members nationwide I appreciate the opportunity which you have afforded us to testify here today on the proposed amendments to the Geothermal Steam Act of 1970 contained in S. 669 and S. 1516.

Established in 1919, NPCA has been a vigorous and vigilant citizens' organization dedicated to the protection, proper expansion, and wise use of the lands and resources of the national park system by the American people.

While we have no objections to the general provisions of the proposed amendments to the Geothermal Steam Act, such as those changing the acreage limitations on leases held by a single company, we wish to express our concerns here today which we urge be incorporated into any amendments to this act which may be approved by the Congress to ensure that units of the national park system are protected from adverse impacts which could occur on lands leased for geothermal energy development. Although the Geothermal Steam Act of 1970 explicitly prohibits geothermal leasing within units of the national park system, this provision is, unfortunately, not sufficient protection for these nationally significant park features when the underground heat source of these features could be tapped by leasing outside park boundaries. Similarly, under the present provisions of the act, drilling and development can occur on private inholdings within park boundaries as occurred in 1979 on the Phillip's tract in Lassen Volcanic National Park.

As presently written, neither S. 669 nor S. 1516 make adequate provision for protection of thermal features in units of the national park system. In fact, S. 1516 fails to even mention this important objective.

The recent history of commercial exploitation of geothermal energy resources around the world is ample evidence that energy production and protection of these natural phenomena such as geysers and hotsprings, are mutually exclusive. Where geysers and other thermal features have been set aside for protection of their natural values and for visitation by tourists, commercial energy production cannot co-exist. For example, the Beowawe geyser area of Nevada, though much smaller, was once second only to Yellowstone on the North American continent in terms of surface thermal phenomena. In the 1940's and the 1950's, wells were drilled nearby and were permitted to discharge, though they were not converted to commercial use. By 1961 the geysers had ceased flowing. Also, the geyser activity at Steamboat Springs, Nevada, is now less than it once was, probably because of nearby geothermal exploration that was performed in the 1950's and early 60's. Of the ten world-ranked areas, only three, including Yellowstone, are essentially undisturbed; four have been adversely affected by man's activities, for example the Geyser Valley thermal field in Wairaki, New Zealand, which was destroyed during the 1950's and early 60's. At least three of these major areas and several minor ones have seen at least temporary, if not permanent, destruction of their geysers through commercial exploration and production of geothermal energy. The enclosed memorandum, by Donald E. White of the U.S. Geological Survey's branch of field geochemistry, notes that, "In general, we cannot exploit the geothermal energy of an area and also preserve its geysers." Further, this memorandum concludes that, "Any changes, once made, are probably irreversible within our lifetimes, and perhaps not even in hundreds of years."

With these concerns for the protection of park thermal features in mind, I would like to address specific amendments to the Geothermal Steam Act which we believe to be necessary in order to assure protection and perpetuation of the nationally significant resources. The Congress, in enacting the Geothermal

Steam Act of 1970, recognized that all units of the national park system should be made off-limits to geothermal development. Similarly, we now believe that protection outside the boundaries must be extended to all units of the national park system. In 1970, the same Congress which passed the Geothermal Steam Act, also enacted the National Park Service's General Authorities Act which states in part that,

> The National Park System which began with the establishment of Yellowstone National Park in 1972, has since grown to include the superlative natural, historic, and recreation areas in every major region of the United States, its territories, and island possessions; that these areas, though distinct in character, are united through their interrelated purposes and resources into one National Park System as cumulative expressions of a single national heritage; that, individually and collectively, these areas derive increased national dignity and recognition of their superb environmental quality through their inclusion jointly with each other in one national park system preserved and managed for the benefit and inspiration of all people of the United States....

Further, in 1978, Congress amended the General Authorities Act and directed, "promotion and regulation of the various areas of the national park system ...shall be consistent with and founded in the purpose established by the first section of the Act of August 25, 1916, to the common benefit of all the people of the United States." These directions from Congress clearly incidate that all 330 some units of the national park system are to be considered equals in terms of the degree of protection legally afforded to each under the law. A nationally significant geyser or hotspring for example, is no less important because it is located in an area like Lake Mead National Recreation Area rather than Yellowstone National Park. When Congress established both areas, the resources within them were to be protected equally, and in general, visitors mark their appreciation and high quality experience based on the nature of the specific feature rather than particular nomenclature somewhat arbitrarily applied to a given area.

Several of the newly established national preserves in Alaska, for example, contain significant thermal features. The legislative history of the Alaska Lands Act clearly indicates that the only difference between national parks and national preserves in Alaska is that sporthunting is permissible within national preserves. There is no logical justification for distinguishing between parks and preserves as regards protection of thermal features.

At present, there are 21 national park system units with known thermal features of national significance. All of these areas deserve full protection under the Geothermal Steam Act amendments. These areas are: Hot Springs National Park, Arkansas; Lassen Volcanic National Park, California; Sequoia National Park, California; Hawaii Volcanoes National Park, Hawaii; Haleakala National Park, Hawaii; Yellowstone National Park, Idaho, Montana, Wyoming; Lake Mead National Recreation Area, Nevada; Big Bend National Park, Texas; Mt. Rainier National Park, Washington; Olympic National Park, Washington; Grand Teton National Park, Wyoming; John D. Rockefeller, Jr. Memorial Parkway, Wyoming; and nine areas in Alaska, including Aniakchak National Monument and Preserve, Bering Land Bridge National Preserve, Denali National Park and Preserve, Gates of the Arctic National Park, Glacier Bay National Park, Katmai National Park, Lake Clark National Park and Preserve, Wrangell-St. Elias National Park and Preserve, and Yukon Charley Rivers National Preserve.

Section 124(f)(1) of S. 669 would require that the Secretary develop a list of nationally significant thermal features located on park lands and describe geographic zones outside the boundaries of these parks where development of geothermal resources may affect nationally significant thermal features, through formal rulemaking. We are concerned about the implications requiring the Secretary to distinguish between thermal features in a given park or possibly even to rank park system units as to their relative national significance or importance. Such a procedure would have potentially deleterious effects on the management of the national park system and would have a potentially precedential effect on law enforcement within the parks. Up to the present, when an area has been designated by Congress as a unit of the national park system, we have understood that area and its resources to be nationally signicant and the protection of the laws governing national parks afforded equally to all forms of wildlife, forests, streams, geologic formations, and other natural features that are protected in the parks. There is no precedent for requiring distinction as to whether one feature is more or less significant and should be more or less protected than another. We see no purpose to be served by requiring time-consuming and expensive rulemaking procedures to determine whether an area or feature already within a national park system unit is nationally significant. Though we believe such a list to be unnecessary and undesirable, should such a list be included in these amendments, a specific time limitation should be included for completion of the list, such as 120 or 180 days from the date of enactment, and a specific proviso requiring that no one unit of the system may be eliminated in its entirety by virture of listing no significant thermal features.

The second part of Section 124(f)(1) dealing with the designation of geographic zones outside the boundaries of the parks is an important component of any amendments to the Geothermal Steam Act in NPCA's view. This provision, however, should be amended to prohibit any leasing in the vicinity of any unit of the national park system until after the Secretary has designated such geographic zones. Such provision will ensure that the Secretary takes into account the need to protect park thermal features prior to permitting any leasing activity which might affect them.

Section 124(f)(2) which specifies the conditions under which geothermal leases may be issued within these geographic zones outside the boundaries of park areas should be amended to require that the test for permissibility of such activities be such that leasing may occur only if the Secretary determines that such lease will not have any adverse effect on nationally significant geothermal features of the park. The use of such qualifying terms as "foreseeably significant" or merely "significant" adverse effect would indicate that there are some levels of degradation of these thermal features which would be deemed to be acceptable. In NPCA's judgment, this is clearly not the case, since no level of degradation of nationally significant thermal features of units of the national park system is acceptable in order to facilitate geothermal energy production. The word "significant," or any other qualifying term should be precluded from this amendment since no adverse effects would be acceptable.

Once such leases to occur within the geographic zones designated by the Secretary adjacent to units of the national park system, the lease agreement should require constant monitoring by the individual or company involved, and an absolute requirement that any perceived fluctuation of park thermal features result in an immediate cessation of exploration or production activities in the zone until a determination can be made of the cause-and-effect relationship. If the resultant determination indicates any potential for a relationship between the commercial geothermal development and damaged park features, there should be an explicit requirement that such commercial activity permanently cease.

In addition, the amendments should require that any drilling activity that is permitted in any geographic zone around a national park system unit reinject 100% of the spent fluids from geothermal wells so as to ensure that hydrostatic pressures are maintained.

Beyond these general recommendations, we believe that specific provisions relating to the three units of the national park system most likely to experience adjacent geothermal energy development, Yellowstone, Lassen, and Mt. Rainier National Parks, should be incorporated into any amendments to the Geothermal Steam Act of 1970. In particular, buffer zones extending beyond the boundaries of these units should be established within which no leasing activity may occur. For Lassen and Mt. Rainier, we would recommend a five mile buffer whereas for Yellowstone, a 50 mile buffer would be appropriate. It should be noted that the House bill, H.R. 4067, contemplates a 15 mile buffer zone for Yellowstone and a one mile buffer for Lassen but none for Mt. Rainier.

Recent research, particularly in the vicinity of Yellowstone, indicates the likelihood of a direct subterranean hydrological connection between thermal features of the Yellowstone caldera and that of the Island Park area to the west outside the national park. Two reports in particular, "Evaluation of

Thermally Active Areas in Southwestern Yellowstone National Park," by Levinson and Marrs (October 1979) of the University of Wyoming, and "Preliminary Interpretation Upper-crustal Seismic Velocity Structure Beneath the Southwestern Side of the Yellowstone National Park Area and the Island Park Caldera Complex," by Brokaw and Smith (July 1981) of the University of Utah provide this evidence. Taken together, their findings would indicate that we can assume a potential linkage between the two caldera regions; there is no apparent geological barrier to geothermal fluid migration between the two calderas, since the bedrock underlying the region is below the depth of potential fluid flow. With the apparent likelihood of a subterranean connection between these two calderas, no commercial exploration or development should be permitted in the vicinity. Any man-caused threat to the integrity of Yellowstone's thermal resources would be totally unacceptable, both nationally and internationally since these features constitute a priceless and irreplaceable component of our national heritage.

As a final point, the Secretary should be directed to give high priority to the acquisition, of either fee or an interest sufficient to preclude geothermal energy development, of all inholdings of private land within units of the national park system containing thermal features. Similarly, high priority should be given to exchange of any state or municipally owned public lands within units of the park system for the same purpose.

In conclusion, Mr. Chairman, NPCA believes that the integrity of the resources of the units of the national park system is of sufficient national importance to provide these measures of protection from the potential harm of geothermal energy development, and urge their incorporation in any amendments to the Geothermal Steam Act of 1970. Thank you again for the opportunity to testify before the Subcommittee on this important legislation.

Senator **Wallop**. Mr. Jarvis, thank you, and I thank everybody for their indulgence in the set of circumstances that suprised us all.

The committee will adjourn subject to the call of Chairman Warner, and that is at the earliest possible date.

Thank you.

[Whereupon, at 11 a.m., the subcommittee adjourned, subject to the call of the Chair.]

APPENDIX

ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD

AMERICAN PUBLIC POWER ASSOCIATION

2301 M STREET, NW WASHINGTON, DC 20037 • 202/775-8300

President WILLIAM H CORKRAN, JR
President-elect JAMES E BAKER
Vice President ROBERT L McKINNEY
Treasurer C M PERKINS
General Counsel NORTHCUTT ELY
Executive Director ALEX RADIN

JAMES E BAKER
Shrewsbury, Massachusetts
HENRY A BELL
Columbus, Ohio
ALBERTO BRUNO-VEGA
Puerto Rico Electric Power Authority
San Juan, Puerto Rico
EARL F BRUSH
Lansing, Michigan
WALTER A CANNEY
Lincoln, Nebraska
HENRY T CARLISLE, JR
Bowling Green, Kentucky
BILL D CARNAHAN
Fort Collins, Colorado
WILLIAM H CORKRAN, JR
Easton, Maryland
RUSSELL DAU
Missouri Basin Municipal Power Agency
Sioux Falls, South Dakota
NORMAN E DIETRICH
Austin, Minnesota
JOE B DYKES, JR
Tallahassee, Florida
LOMA W HARTKE
Huntingburg, Indiana
PAUL F HEMBREE
Nashville, Tennessee
DON HOWLAND
Duncan, Oklahoma
GORDON W HOYT
Anaheim, California
BEN HUFFSTODT
Princeton, Illinois
DICK KIRKHAM
Minnesota Municipal Utilities Association
Buffalo, Minnesota
JACK H MADISON
Tillamook People's Utility District
Tillamook, Oregon
RICHARD E MALON
Columbia, Missouri
ROBERT L McKINNEY
Cowlitz County Public Utility District
Longview, Washington
JOHN S McQUEEN
Chattanooga, Tennessee
WILLIAM MESCHER
Santee Cooper
Moncks Corner, South Carolina
ERNEST J MULLEN
Kaukauna, Wisconsin
JOHN P MUNNELLY
Omaha Public Power District
Omaha, Nebraska
PAUL J NOLAN
Tacoma, Washington
PHILLIP C OTNESS
Massachusetts Municipal
Wholesale Electric Company
Ludlow, Massachusetts
C M PERKINS
Salt River Project
Phoenix, Arizona
JAMES H PHILLIPS
Sebring, Florida
GEORGE D REICH
Plattsburgh, New York
HAROLD SCHIEBOUT
Sioux Center, Iowa
SIMON C SITTERSON
Kinston, North Carolina
J K SPRUCE
San Antonio, Texas
GEORGE H USRY
Athens, Tennessee
H S VANDERLINDEN
Harlan, Iowa
WILLIAM C WALBRIDGE
Sacramento Municipal Utility District
Sacramento, California
ROBERT C YOUNG
Burlington, Vermont

October 27, 1981

The Honorable John W. Warner
Subcommittee on Energy & Mineral
 Resources
Senate Committee on Energy and
 Natural Resources
3204 Dirksen Senate Office Building
Washington, D. C. 20510

Dear Mr. Chairman:

On behalf of the American Public Power Association, I want to express my appreciation to you and your staff for soliciting our comments on S.1516 the Geothermal Steam Act of 1981. I regret that we were unable to testify. I hope that you will accept this letter in lieu of formal testimony and that this letter will be included in the hearing record on this measure.

As you know, the American Public Power Association is the national service organization representing over 1,750 local public power systems throughout the country. Collectively, more than 13.5 percent of the nation's consumers are served by local publicly owned electric utility systems. Publicly owned systems are actively exploring all feasible means of providing the energy services demanded by their customers at the lowest possible cost.

Many public power systems are developing the power production potential of known geothermal resources, and many others are exploring the feasibility of such ventures. To encourage the continued involvement of local public power systems in the utilization of this resource, we believe that two provisions should be added to S.1516. First, we urge you to add to the bill a provision which reserves a reasonable number of lease tracts for leasing by public bodies and rural electric cooperatives. Second, we believe the legislation should encourage the use of alternatives to the cash bonus bidding system.

During the 96th Congress, the Senate passed a bill, S.1388, which contained provisions such as we are advocating today. Section 128 of that measure, for example, provided that "a reasonable number of leasing tracts, not to exceed 10 per centum of the acreage leased in any year, shall be offered on the basis of a specific application for such tract in accordance with this section to public bodies, including rural electric cooperatives, or nonprofit corporations controlled by and predominantly made up of any of such entities." This lease "set aside" was conditioned on the requirement that these public bodies or cooperatives develop the resource and produce energy for their own use or for sale to their members or customers.

While we supported this provision of S.1388, we believe it would be more appropriate to set a floor rather than a ceiling for such a "set aside". We would thus recommend that the language of section 128 of S.1388 be modified to require that at least 10 percent of the acreage be offered to public bodies and electric cooperatives, and that it then be incorporated in S.1516.

We believe there are a number of very persuasive public policy arguments for establishing such a lease "set aside" program, including the following:

1. This is a modest and reasonable proposition. Whether the Secretary is required to set aside a reasonable number of tracts up to a certain percentage, or no less than a certain percentage, the requirement would not tie up for any extended period a particular number of leases. If there were insufficient interest in the tracts so reserved, they could then be leased to other interested parties.

2. The Federal government is in the position of a trustee, holding these lands for the benefit of the general public. The public, acting through their local or state governments or through nonprofit corporations, should have an opportunity to develop and utilize this resource. It is certainly not unreasonable to reserve 10 percent of the public's geothermal resources for direct development by the public.

3. Many public power systems throughout the country operate under "sunshine" laws which place them at a competitive disadvantage vis-a-vis private corporations in a sealed bid situation. Because a municipality's bid is public knowledge, a private entity may easily submit a slightly higher bid and thereby secure the lease. In addition to state statutes, many municipal corporations have adopted local ordinances to the same effect.

4. Public development of energy resources can serve as a yardstick by which the performance of private developers can be measured. This form of competition serves to hold down both the cost of development as well as the cost of the final product.

5. The lease "set aside" provisions we are advocating are consistent with policies contained in other Federal statutes which have granted a first option to develop and use public resources to public bodies and rural electric cooperatives. For example, public power systems and rural electric cooperatives have preference in the purchase of Federal surplus hydroelectric power, public bodies have preference in licensing of hydroelectric sites, and preference in coal leasing on Federal lands is granted to public bodies and rural electric cooperatives under section 2 of the Mineral Lands Leasing Act.

The other amendment we urge you to consider is a requirement that at least a portion of the geothermal leases be offered through something other than a cash bonus bidding system. S.1388 initially contained a requirement that at least 10 percent of all lands offered for sale in any year be offered on a basis other than cash bonus bidding. This was modified during the Energy Committee markup to require that "the Secretary shall attempt to offer 10 per centum of all lands offered for sale in any year on a basis other than cash bonus bidding, employing those bidding systems set forth in section 8(a)(1) of the Outer Continental Shelf Lands Act, as amended." (S.1388, section 107, as repored.) As stated in the Committee Report, (Senate Report No. 96-699) alternatives to cash bonus bidding were to be provided to "assure a role for smaller companies in geothermal development by offering some lands with reduced front-end capital requirements."

Public bodies -- like small companies -- have difficulty in competing for leases in a cash bonus bidding system. Unlike large, private enterprises, public bodies do not have immediate access to cash assets. Frequently, bonds must be issued to raise funds, and this quite often requires voter approval. If cash bonus bidding is to be used exclusively, as provided in S.1516, then this valuable public resource may ultimately be tied up by the nation's largest energy companies. Congress has consistently opposed such monopoly control over public resources. Requiring alternatives to cash bonus bidding similar to those in S.1388 as introduced or as amended by this Committee, together with providing a public body lease "set aside", would insure that not only the largest and richest companies can develop this valuable national resource.

Again, we appreciate your interest in having APPA's views. I hope you will find our comments helpful and will agree that the amendments we are advocating should be incorporated in S.1516. Please don't hesitate to contact us if you wish to discuss in greater detail the points raised above.

Sincerely,

Alan H. Richardson
Legislative Director and
Legislative Counsel

cc: Subcommittee Members

STATEMENT OF SOUTHERN CALIFORNIA EDISON COMPANY

The Southern California Edison Company (Edison) welcomes the opportunity to present its comments and recommendations before the Senate Energy Subcommittee on Energy and Mineral Resources relative to S.1516 which would amend the Geothermal Steam Act of 1970 for the purpose of expediting exploration and development of domestic geothermal energy resources.

INTRODUCTION

Edison is an investor-owned electric utility which provides essential electric service in a 50,000 square mile area of central and southern California. This area includes some 800 cities and communities with a population of more than eight million people.

Edison's gross investment in utility plant totals nearly $8.4 billion. Operating capacity at peak during 1980 totalled 15,504 megawatts (MW), which included 13,221 MW of Company-owned facilities and 2,283 MW of capacity from other sources. Of the Company-owned facilities, 78% or 10,312 MW is comprised of oil- and gas-fired generating units. Edison's interest in coal-fired generating units accounted for another 12%, 7% is in hydroelectric plants, and the Company's 80% interest in a nuclear plant accounted for the remaining 3%.

Edison is subject to what are among the most restrictive air quality regulations in the United States. Such restrictive air quality regulations mandate that Edison use low-sulfur fuel oils with a maximum sulfur content of 0.25% by weight in its existing oil- and gas-fired generating facilities when natural gas is not available.

Edison's energy resources are probably more diverse than those of any other utility and this diversity reflects our determination to explore and evaluate every possible energy resource and, above all, to reduce our dependence on low-sulfur fuel oils.

Edison has an inherent interest in geothermal energy development in that Edison has committed to devoting a major share of its corporate resources to the accelerated development of a wide variety of alternative and renewable energy resources including geothermal, wind, solar, fuel cells, small hydro, cogeneration, and synthetic fuels. Success in the development of these new energy forms will contribute to reducing Edison's dependence on low-sulfur fuel oils and the adverse financial impact of large generating facility development that requires costly construction and long lead times for regulatory approval.

"Solar One", Edison's first R&D solar effort is presently under construction, in cooperation with the Department of Energy and others, near Barstow, California. It is rated at ten megawatts, and will be the nation's first central-station solar generating facility.

Edison also has an R&D wind machine operating in the San Gorgonio Pass area near Palm Springs, California. It is rated at one megawatt of firm capacity and can deliver as much as three megawatts with a wind of 40 miles per hour.

Edison is also actively involved with several potential geothermal energy suppliers in the initial development of geothermal energy for electric generation in southern California's Imperial Valley where Edison is presently operating a nine megawatt R&D geothermal generating unit in the Brawley area. An additional nine megawatt R&D geothermal generation facility is presently under construction in the Salton Sea area. Our experience indicates that the development of geothermal brine resources in the Imperial Valley, in contrast with the Geysers in northern

California, one of the world's few known dry-steam geothermal resources, is a high risk, capital-intensive, and highly technical undertaking. Based on ongoing negotiations with potential geothermal energy suppliers, it appears that it will be extremely difficult to develop these brines, utilizing current technology to produce electricity, at or below the cost associated with Edison's existing oil-fired generation.

This marginal economic aspect of geothermal energy development is also illustrated by the fact that earlier this year Edison submitted Geothermal Solicitation Announcements for geothermal energy project proposals to 80 firms active in the geothermal industry. Approximately one-half of the recipients responded to the solicitation. Only two proposals have been received: one for a 50 MW steam sale in Nevada and one for drilling apparatus.

BACKGROUND

For the past several years Edison, through its wholly-owned energy resource and development subsidiary Mono Power Company, has also been actively engaged in the exploration and development of potential geothermal energy resources on the federal domain. These exploration and development efforts, however, have been greatly hampered by the current provisions and implementing regulations of the Geothermal Steam Act of 1970 (Geothermal Steam Act).

For example, the present definition of "Known Geothermal Resource Area" (KGRA) under the Geothermal Steam Act is vague and ambiguous as it is not based on substantial physical evidence. Consequently, any party who files a non-competitive lease application is often placed in an uncertain position as actions of others who may file on the same parcel may result in the lands in question being reclassified as a KGRA and the lands offered for competitive bid. This potential reclassification of lands as a KGRA due to "competitive interest" occurs whether or not there exists substantial physical evidence, such as a discovery well, temperature gradient holes, or natural hot springs which would, in Edison's opinion, justify the KGRA classification. Such competitive interest reclassifications have completely halted efforts to explore and develop geothermal resources in many areas due to the fact that potential developers can ill-afford the cost imposed by competitive bidding for lands which are not proven geothermal resources and for which the potential for commercial development may be marginally economic at best.

The Geothermal Steam Act also unduly limits the acreage allotments for geothermal leases per state, per lessee to 20,480 acres. Such a limitation impedes the simultaneous and, therefore, the economic and efficient exploration and development of potential geothermal resources.

Another difficulty related to leasing under the Geothermal Steam Act is the inordinate amount of time required to process lease and permit applications. Presently, a number of Mono Power Company lease applications submitted to the Department of the Interior in 1974 have not yet been processed. Such a situation results from the fact that the Geothermal Steam Act does not contain provisions which establish reasonable time limitations for governmental decision-making on lease and permit applications.

COMMENT SPECIFIC TO S.1516

Edison supports S.1516 as this legislation would amend the Geothermal Steam Act in such a manner as to resolve most of the previously described deficiencies and encourage the accelerated development of domestic geothermal resources.

1. KGRA Definition

The proposed amendment to the definition of KGRA would resolve the competitive interest dilemma by providing that an area may not be declared a KGRA unless there is substantial physical evidence that such a designation is appropriate.

2. **State Acreage Limitation**

The proposed increase in the state acreage limitation from 20,480 to 51,200 acres and the provision for a subsequent increase, by regulation, in the maximum holding not to exceed 115,200 acres, would provide an appropriate and much needed economic incentive to explore and develop geothermal resources.

RECOMMENDATION

While Edison supports S.1516, we respectfully recommend that the following provisions be included within this legislation which would (1) expedite governmental decision-making by establishing time limitations for decisions on lease and permit applications, and (2) require the reclassification of those lands previously designated as a KGRA absent substantial physical evidence, in order to provide an economic incentive to develop such lands:

A. **Expedited Lease and Permit Application Processing**

Edison specifically suggests that S.1516 contain a provision which would amend Section 24 of the Geothermal Steam Act by designating the present provisions of Section 24 as subsection (a); redesignating (a), (b), (c), (d), (e), (f), (g), (h), and (i) as (i), (ii), (iii), (iv), (v), (vi), (vii), (viii), and (ix); and by adding the following:

> "(b) The Secretary shall render a decision on a lease application within one year of the filing of the application. In addition, each lease application shall be reviewed and an initial report prepared and directed to the applicant within ninety days of filing, indicating the results of the initial review, what disposition is proposed, and the projected time to complete action on the application."

"(c) The Secretary shall render a decision on (i) a permit application to conduct exploration activities, including the drilling of exploratory wells, within one hundred and eighty days after filing such application; and (ii) all other permit applications within one year of the filing of the application. In addition, each permit application shall be reviewed and an initial report prepared and directed to the applicant within ninety days of filing, indicating the results of the initial review, what disposition is proposed, and the projected time to complete action on the application."

"(d) The Secretary may for good cause extend the period for a decision on any lease or permit application for an additional period determined to be reasonable in specific cases, not to exceed ninety days."

B. Reclassification of Certain Lands Designated as Known Geothermal Resource Area

Edison specifically suggests that S.1516 contain a provision reflecting the following language which would require the Secretary of Interior to reclassify lands designated as a "KGRA" pursuant to the Geothermal Steam Act of 1970 so that those lands will come within the meaning of a "KGRA" as defined in S.1516:

> "The Secretary shall reclassify, within one year after the date of enactment of this Act, such unleased lands which were designated earlier as a 'Known Geothermal Resource Area' so that those lands will be designated as a 'Known Geothermal Resource Area' only if such lands meet the requirements as defined in Section 4 of this Act. The Secretary shall adopt regulations to implement this provision."

STATEMENT OF

GEORGE MARIENTHAL
PRINCIPAL DIRECTOR
LOGISTICS AND MATERIEL MANAGEMENT
OFFICE OF THE SECRETARY OF DEFENSE

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE, THANK YOU FOR THIS OPPORTUNITY TO PRESENT AN OVERVIEW OF THE DEPARTMENT OF DEFENSE (DOD) GEOTHERMAL ENERGY PROGRAM AND TO PROVIDE OUR VIEWS ON S. 1516, A BILL TO AMEND THE GEOTHERMAL STEAM ACT OF 1970. I AM GEORGE MARIENTHAL, PRINCIPAL DIRECTOR FOR LOGISTICS AND MATERIEL MANAGEMENT IN THE OFFICE OF THE SECRETARY OF DEFENSE. MR. THOMAS A. LADD, HEAD OF NAVY SHORE FACILITIES ENERGY PROGRAMS, NAVAL FACILITIES ENGINEERING COMMAND, AND DOD'S GEOTHERMAL PROGRAM COORDINATOR, IS ACCOMPANYING ME TODAY.

BY WAY OF OVERVIEW THIS MORNING, I WILL DESCRIBE:

- THE GROWING IMPORTANCE OF DEFENSE ENERGY USE AS A BUDGETARY, OPERATIONAL, AND POLICY ISSUE,
- DEFENSE ENERGY PRIORITIES FOR FISCAL YEAR 1982 AS THEY RELATE TO THE SUCCESSFUL ACCOMPLISHMENT OF DOD'S MISSION,
- OUR GEOTHERMAL ENERGY PROGRAM, AND
- OUR SPECIFIC COMMENTS ON S. 1516.

DEFENSE ENERGY USE

THE DEPARTMENT OF DEFENSE IS THE SINGLE LARGEST ENERGY CONSUMER IN THE UNITED STATES. FISCAL YEAR 1981 DOD ENERGY COSTS EXCEEDED $10 BILLION AND REPRESENTED MORE THAN FIVE PERCENT OF THE DOD BUDGET. WE CONSUME ANNUALLY AN EQUIVALENT OF 250 MILLION BARRELS OF OIL. THIS AMOUNTS TO TWO PERCENT OF NATIONAL ENERGY CONSUMPTION AND 80 PERCENT OF FEDERAL SECTOR ENERGY CONSUMPTION. FOR EXAMPLE, DOD CONSUMES 50 PERCENT OF THE MOTOR GASOLINE, 85 PERCENT OF THE HEATING OIL, AND NEARLY 100 PERCENT OF THE JET FUEL IN THE FEDERAL GOVERNMENT. DOD IS DEPENDENT HEAVILY ON PETROLEUM FUELS, WHICH REPRESENT 69 PERCENT OF OUR TOTAL ENERGY

CONSUMPTION AND 75 PERCENT OF OUR TOTAL ENERGY COSTS. ANOTHER MAJOR FORM OF ENERGY THAT WE CONSUME IS ELECTRICITY, WHICH ACCOUNTS FOR 20 PERCENT OF OUR TOTAL ENERGY CONSUMPTION AND 16 PERCENT OF OUR TOTAL ENERGY COSTS. ENERGY IS CENTRAL AND CRITICAL TO THE OPERATIONAL READINESS OF THE STRATEGIC AND TACTICAL FORCES. EFFECTIVE MANAGEMENT OF DEFENSE ENERGY RESOURCES IS ESSENTIAL TO SUCCESSFUL ACCOMPLISHMENT OF THE DEFENSE MISSION.

DEFENSE ENERGY PRIORITIES - 1982

WE HAVE DEVELOPED ENERGY MANAGEMENT PRIORITIES WHICH PROVIDE AN EFFECTIVE FRAMEWORK TO MANAGE THE COSTLY AND VITAL DOD ENERGY PROGRAM. OUR ENERGY MANAGEMENT PRIORITIES FOR FISCAL YEAR 1982 ARE BASED ON AN ASSESSMENT OF DOD'S PROGRESS IN ENERGY MANAGEMENT TO DATE, LONGER TERM GOALS, AND THE MOST IMPORTANT NEXT STEPS TO ACHIEVE THESE GOALS. EACH PRIORITY GROUP REFLECTS THE AREAS WHICH WILL NEED THE MOST MANAGEMENT ATTENTION IN 1982.

THE FOLLOWING IS A LIST OF PRIORITY DEFENSE ENERGY MANAGEMENT ACTIONS FOR FY 1982. THEY ARE DESIGNED TO:

- ASSURE THE SUPPLY OF FUEL TO DOD UNDER ALL CIRCUMSTANCES. ENERGY AND NATIONAL DEFENSE ARE INEXTRICABLY LINKED. THE MISSION OF THE DEPARTMENT OF DEFENSE IS CLEARLY TO BE PREPARED TO DEFEND SUCCESSFULLY THE COUNTRY AGAINST FOREIGN AGGRESSION. COMBAT READINESS REQUIRES PRODIGIOUS AMOUNTS OF ENERGY. OUR MOST BASIC POLICY IN DEFENSE ENERGY, THEREFORE, IS TO ENSURE A SUPPLY OF ENERGY SUFFICIENT TO MEET ESSENTIAL TRAINING REQUIREMENTS IN PEACETIME AND SUSTAINABILITY REQUIREMENTS IN WARTIME.

MANAGEMENT ACTIONS IN THIS GROUP RELATE TO ENERGY SUPPLY, PROCUREMENT, AND CONTINGENCY PLANNING.

- IMPROVE DOD PETROLEUM LOGISTICS POLICIES. IT IS EQUALLY IMPORTANT THAT AN INFRASTRUCTURE IS FIRMLY IN PLACE TO HANDLE ADEQUATELY THE FLOW OF FUEL DURING PEACETIME AND EMERGENCY SITUATIONS. MANAGEMENT ACTIONS IN THIS GROUP RELATE PRIMARILY TO PETROLEUM STOCKAGE AND STORAGE POLICY.
- IMPROVE PROCEDURES TO INCREASE THE CONSIDERATION OF ENERGY CONSERVATION IN THE DEFENSE SYSTEMS ACQUISITION PROCESS. MANAGEMENT ACTIONS IN THIS GROUP RELATE TO ENERGY EFFICIENCIES AND ECONOMIES IN DEFENSE WEAPON AND SUPPORT SYSTEM SELECTION, DESIGN, AND DEVELOPMENT.
- ENHANCE ENERGY CONSERVATION, CONVERSION, AND MANAGEMENT INITIATIVES. FACILITY ENERGY USE AMOUNTS TO APPROXIMATELY 40 PERCENT OF DOD'S TOTAL ENERGY USE AND, AS SUCH, FACILITY ENERGY CONSERVATION AND CONVERSION HAVE BEEN A SIGNIFICANT PART OF OUR EFFORT TO ENSURE ENERGY ECONOMIES AND EFFICIENCIES. WE REALIZE THAT THE CHEAPEST, MOST IMMEDIATELY AVAILABLE ENERGY IS THAT WHICH WE ALREADY HAVE, BUT HAVE AVOIDED EXPENDING THROUGH INCREASED EFFICIENCY AND MORE STRINGENT CONTROLS. IN ADDITION, ENERGY CONVERSION EFFORTS, SUCH AS THE DEVELOPMENT OF GEOTHERMAL ELECTRIC RESOURCES, WILL REDUCE OUR DEPENDENCE ON OIL CONSUMING UTILITIES FOR MILITARY BASE POWER REQUIREMENTS.

DEFENSE GEOTHERMAL ENERGY PROGRAM

THE PRIMARY THRUST OF OUR GEOTHERMAL ENERGY PROGRAM IS TO:

- IDENTIFY GEOTHERMAL RESOURCES ON DoD LANDS AND
- INITIATE MANAGEMENT ACTIONS TO ALLOW DEVELOPMENT OF ALL OR A PORTION OF THESE RESOURCES.

WE HAVE BEEN CAREFUL TO PRESERVE OUR CAPABILITY TO PERFORM THE MILITARY MISSION ON THESE LANDS, E.G., WEAPONS TESTING AND TRAINING, IN CONJUNCTION WITH DEVELOPING THEIR GEOTHERMAL POTENTIAL.

IN 1976, THE DEFENSE GEOTHERMAL PROGRAM WAS INITIATED AT THE NAVAL WEAPONS CENTER (NWC), CHINA LAKE, CALIFORNIA, WHERE THE COSO KNOWN GEOTHERMAL RESOURCE AREA WAS IDENTIFIED. COSO HAS BEEN ESTIMATED TO HAVE A POTENTIAL AS HIGH AS 4,000 MEGAWATTS ELECTRIC OR 70 MILLION BARRELS OF OIL PER YEAR. WE BELIEVED THAT AT THIS AND OTHER GEOTHERMAL SITES LOCATED WITHIN MILITARY LANDS COULD BE SAFELY DEVELOPED WITHOUT INTERFERING WITH ACTIVITY MISSIONS. THIS COULD ONLY BE ACCOMPLISHED THROUGH THE COOPERATION OF THE DEPARTMENTS OF DEFENSE AND THE INTERIOR (DoI) AND INDUSTRY.

AT CHINA LAKE, THE DEPARTMENT OF THE NAVY REACHED AN AGREEMENT WITH DoI WHICH PROVIDED FOR THE NAVY TO DEVELOP 10 PERCENT OF THE COSO RESOURCE, WHILE THE REMAINDER WOULD BE OFFERED FOR PRIVATE LEASING THROUGH DoI. TOWARDS THIS END, WE AGREED WITH DoI ON A SET OF CONSTRAINTS OVER NAVY AND INDUSTRIAL ACTVITIES IN THE GEOTHERMAL AREA. A CONTRACT WAS AWARDED IN DECEMBER, 1979, TO PRIVATE INDUSTRY FOR DEVELOPMENT OF THE NAVY'S PORTION OF THE RESOURCE. UNDER THE TERMS OF THIS CONTRACT, DoD

WILL NOT INTERFERE WITH WHAT THE PRIVATE SECTOR IS PREPARED TO UNDERTAKE. DOD SIMPLY MAKES THE RESOURCE AVAILABLE AND AGREES TO PURCHASE THE ENERGY PRODUCED FROM IT. THE DEVELOPER FINANCES THE RESOURCE DEVELOPMENT, JUST AS WOULD OCCUR ON LEASED LAND, AND RECOUPS THAT INVESTMENT THROUGH THE LONG TERM SALE OF ENERGY TO DoD.

TO DATE, THE CONTRACTOR HAS PREPARED SUCCESSFULLY TWO DRILL SITES PREPARATORY TO DRILLING THE INITIAL EXPLORATORY WELLS AT COSO. EQUALLY IMPORTANT, DoI HELD A LEASE SALE ON SEPTEMBER 15, 1981, ON THE REMAINDER OF THE RESOURCE. THIS WAS THE SECOND LARGEST LEASE SALE THAT DoI HAS HELD IN TERMS OF TOTAL DOLLAR AMOUNT BID. BASED ON THIS, WE BELIEVE THAT THE JOINT DoD-DoI COSO GEOTHERMAL RESOURCE DEVELOPMENT INITIATIVE HAS BEEN SUCCESSFUL SO FAR.

TO DATE, 75 ADDITIONAL DoD SITES HAVE BEEN IDENTIFIED AS HAVING SOME DEGREE OF GEOTHERMAL RESOURCE POTENTIAL. A CONTRACT SIMILAR TO THAT USED AT CHINA LAKE HAS BEEN ADVERTISED TO SEEK PROPOSALS FOR GEOTHERMAL RESOURCE DEVELOPMENT AT WILLIAMS AIR FORCE BASE, ARIZONA. WE ANTICIPATE THAT ANOTHER CONTRACT WILL BE ADVERTISED IN JANUARY, 1982, FOR GEOTHERMAL RESOURCE DEVELOPMENT AT THE NAVAL AIR STATION, FALLON, NEVADA. OTHER RESOURCES ARE ALSO BEING EVALUATED FOR FUTURE DEVELOPMENT IN ALASKA, HAWAII, NEW MEXICO, TEXAS, GEORGIA, DELAWARE, AND VIRGINIA. THE CONTINUANCE OF THIS DoD PROGRAM WILL PLACE OTHERWISE UNAVAILABLE GEOTHERMAL RESOURCES BEFORE THE INDUSTRY FOR DEVELOPMENT.

DoD COMMENTS ON S. 1516

THE 76 DoD SITES IDENTIFIED AS HAVING GEOTHERMAL POTENTIAL REPRESENT OVER ONE HALF OF ALL DoD LANDS. RESPONSIBILITY FOR DEVELOPMENT OF THESE RESOURCES CARRIES WITH IT THE COMMENSORATE RESPONSIBILITY NOT TO INTERFERE WITH THE MISSIONS OF THE MILITARY ACTIVITIES CO-LOCATED WITH THE RESOURCES.

IN THIS REGARD, SECTION 10 OF S. 1516 DIFFERENTIATES BETWEEN "ACQUIRED" LANDS AND "WITHDRAWN PUBLIC DOMAIN" LANDS. IT ALLOWS DoI TO LEASE LANDS THAT DoD HAS WITHDRAWN FROM THE PUBLIC DOMAIN WITHOUT DoD CONSENT. IT DOES REQUIRE OUR CONSENT FOR THE LEASING OF DoD ACQUIRED LANDS, HOWEVER. THIS WOULD RESULT IN AN UNWORKABLE SITUATION SINCE BOTH TYPES OF LAND ARE INTERMINGLED AT ANY SPECIFIC ACTIVITY, AND THE MISSION OF EACH IS IDENTICAL AND ESSENTIAL. TO ASSUME THAT LEASING COULD OCCUR ON WITHDRAWN LANDS WITHOUT DoD CONCURRENCE IS TO ASSUME THAT THE MISSION OF THE ACTIVITIES INVOLVED CAN BE ELIMINATED. IN ORDER FOR MILITARY ACTIVITIES TO CONDUCT TRAINING AND MILITARY OPERATIONS WITHOUT INTERFERENCE, DoD MUST RETAIN THE RIGHT OF CONSENT OVER THE LEASING FOR GEOTHERMAL DEVELOPMENT OF ANY OF THE LANDS UNDER DoD JURISDICTION.

DoD IS SUPPORTIVE OF GEOTHERMAL DEVELOPMENT WITHIN AND NEAR MILITARY ACTIVITIES. EACH MILITARY ACTIVITY IS UNIQUE AND MUST HAVE THE OPPORTUNITY TO DETERMINE ITS OWN UNIQUE SET OF CONSTRAINTS OVER GEOTHERMAL DEVELOPMENT WITHIN ITS BOUNDARIES. THESE CONSTRAINTS MUST THEN BE TESTED TO ASSURE THAT THEY PROTECT THE ACTIVITY MISSION PRIOR TO OPENING THE ENTIRE RESOURCE TO DEVELOPERS. THE QUICKEST, SAFEST, AND SUREST WAY TO ACCOMPLISH

THIS IS FOR DoD TO DEVELOP A PORTION OF THE RESOURCE, AS HAS BEEN DONE AT CHINA LAKE, UNDER A THIRD PARTY CONTRACT RATHER THAN A LEASE. A CONTRACT CAN BE MORE EASILY ALTERED OR MODIFIED, IF NECESSARY, TO ENSURE CONTINUANCE OF THE MISSION AT THE ACTIVITY IN QUESTION. THE REMAINDER OF THE GEOTHERMAL RESOURCE WOULD BE OFFERED FOR LEASING TO PRIVATE DEVELOPERS WITH AGREED UPON CONSTRAINTS.

SECTION 11 OF S. 1516, WHILE PROVIDING FOR DoD DEVELOPMENT OF A PORTION OF THE RESOURCE, IS SO RESTRICTIVE THAT THE DEVELOPMENT MAY NEVER OCCUR. WE NOTED FURTHER THAT, UNDER THE REQUIREMENTS OF THE CURRENT LAW, THE TERMS AND CONDITIONS, INCLUDING DoD MISSION-RELATED CONSTRAINTS, CANNOT BE ALTERED FOR TEN YEARS. THIS REQUIRES THAT THE CONSTRAINTS BE PROVEN PRIOR TO LEASING. S.1516 WOULD EXTEND THE LEASE FOR READJUSTMENT OF THE TERM FROM 10 TO 20 YEARS. WE OPPOSE THIS EXTENSION BECAUSE 20 YEARS IS TOO LONG. IT WOULD NOT ALLOW US THE OPPORTUNITY TO ADAPT TO CHANGES IN MISSION AND ENVIRONMENTAL REQUIREMENTS IN A TIMELY FASHION.

THE DEPARTMENT OF DEFENSE GENERALLY SUPPORTS LEGISLATION SUCH AS S. 1516 AS FAR AS IT PROVIDES:

- NEEDED CLARIFICATION OF DoI AUTHORITY TO LEASE GEOTHERMAL RESOURCES LOCATED WITHIN LANDS UNDER DoD JURISDICTION, AND
- CONTINUED AUTHORITY FOR DoD DEVELOPMENT OF GEOTHERMAL RESOURCES, SUCH AS IS ALREADY UNDERWAY AT CHINA LAKE.

NEW LEGISLATION SHOULD ALSO GUARANTEE THAT IN THE PROCESS OF GRANTING THE RIGHT TO LEASE GEOTHERMAL RESOURCES:

- THE ULTIMATE RESPONSIBILITY FOR DoD TO CONTINUE THE MISSION OF THE MILITARY ACTIVITY CO-LOCATED WITH THE RESOURCE IS PRESERVED THROUGH OUR FINAL CONSENT TO THE LEASING, AND
- YOU SHOULD ENSURE THAT THE CHECKS AND BALANCES INCLUDED IN THE PROVISION ALLOWING FEDERAL DEVELOPMENT OF THE RESOURCE ARE NOT SO RESTRICTIVE THAT THEY INHIBIT THE AGENCY FROM PROCEEDING WITH DEVELOPMENT.

WE BELIEVE THAT WITH THESE SAFEGUARDS BUILT INTO S. 1516 THIS LEGISLATION WOULD EXPEDITE EXPLORATION AND DEVELOPMENT OF GEOTHERMAL RESOURCES ON FEDERAL LANDS WHILE SAFEGUARDING THE RIGHTS OF THE DEPARTMENT OF DEFENSE TO USE THE LANDS TO ACCOMPLISH THE DEFENSE MISSION. WE UNDERSTAND THAT THE ADMINISTRATION HAS RAISED OTHER CONCERNS WITH S. 1516 THAT THE DEPARTMENT OF THE INTERIOR WITNESS HAS ADDRESSED.

THIS CONCLUDES MY STATEMENT. WE WOULD BE HAPPY TO ANSWER ANY QUESTIONS THAT THE SUBCOMMITTEE MAY HAVE.

Geothermal Resources International, Inc.
545 Middlefield Road, Suite 200, Menlo Park, CA 94025 (415) 326-5470

GRI

September 11, 1981

Honorable John W. Warner
Chairman
Subcommittee on Energy & Mineral Resources
Committee on Energy & Natural Resources
U.S. Senate
Washington, D.C. 20510

Dear Senator Warner:

We are among the independent geothermal energy producers that are supporting enactment of your bill, S. 1516, which would amend the Geothermal Steam Act of 1970. We congratulate you on moving ahead with a hearing on this bill on September 15; and we should appreciate it if a copy of this letter is included in the hearing record.

We are a small company engaged also in transportation equipment leasing. Our offices, which until August 1 of this year had been in Marina del Rey, California, are now at Suite 200, 545 Middlefield Road, Menlo Park California 94025-3471. We also have an office at 1700 Three Penn Center Plaza in Philadelphia 19102. We expect to expand our program of geothermal development at The Geysers in California and elsewhere in the country contingent partly upon enactment of legislation along the lines of your bill.

It is now well recognized that geothermal resources present a viable alternative energy source of signficant potential. However, as you stated in recent remarks in the Congressional Record, certain institutional barriers still exist and must be removed.

Your bill, like the companion House bill, H.R. 4067, accomodates this need by such measures as (1) redefining "known geothermal resource areas"; (2) declassifying as a "KGRA" any lands that have been offered for competitive bidding without drawing any bids; and (3) increasing the acreage limitation per state from 30,480 acres to 51,200 acres. The bill wisely redefines "production or utilization of geothermal resources in commercial quantities" so as to include a completion of producing or producible wells, and either a bona fide sale for delivery to facilities installed or to be installed within 15 years from the date of the lease, or in case of direct use of the energy by the lessee, a proof of a commitment to construct such facilties.

We commend these and the other provisions of your bill as steps that will promote development of geothermal resources from public lands in the public interest.

As we have advised the House committee, we would have no objection if modest or reasonable provisions were to be added to the bill so as to remove nationally significant national park system lands from the possibility of damage from geothermal development. It is our belief, however, that existing laws satisfactorily provide for protection of national park system units without any real need for the inclusion of additional protections in this legislation.

As we also advised the House committee, we would encourage expedited treatment in the Federal district courts of any litigation that might arise under the Act. However, we believe that caution should be exercised in any judicial review provision so as to avoid the possibility of unintentionally expanding the jurisdiction of the district courts of administrative proceedings. We have reference here to the sound principle, derived from case law and embodied in the Administrative Procedure Act, that judicial review should not be available in matters that have been finally decided by an administrative agency acting under legislatively delegated administrative discretion.

We oppose any amendment to your bill that would set aside any of the public lands for priority leasing to certain classes of industrial organizations, such as publicly owned electric utilities or rural electric cooperatives. The set-aside provisions of the Senate committee's version of this legislation in the previous Congress was, in our view, unnecessary, unjustifiable and unwise. We know of no sound principle that justifies the granting to special privileges of public-land access to any one class of commercial developer over another; and we point out that the administration of such special privileges would entail extensive delays in the leasing process.

We also oppose any amendment that might be sought so as to alter the existing arrangements under which mineral development may be undertaken on land, such as Stock-Raising Homestead lands, on which mineral resources have been retained in the title of the United States. Certainly no such amendment should be countenanced if it would unduly delay the time at which geothermal or other mineral development may proceed, or if it would tend to increase the compensation for damages to the surface rights beyond the level provided for by law at the time the surface rights were patented.

We appreciate your continued interest in the proper management of the public lands and in timely and appropriate geothermal and other mineral development in a manner consistent with protection of the natural environment.

Sincerely,

Domenic J Falcone
Domenic J. Falcone
Senior Vice President

DJF:mec

bc: Karl Landstrom

SIERRA
CLUB

330 Pennsylvania Avenue, S.E.
Washington, D.C. 20003 (202) 547-1141

STATEMENT OF TIM MAHONEY
WASHINGTON REPRESENTATIVE, SIERRA CLUB
BEFORE THE
SENATE ENERGY AND NATURAL RESOURCES COMMITTEE,
ENERGY AND MINERAL RESOURCES SUBCOMMITTEE,
ON S. 1516 AND S. 669
GEOTHERMAL LEASING LEGISLATION

October 27, 1981

Mr. Chairman, members of the Committee, I am Tim Mahoney, Washington Representative for the Sierra Club, a national conservation organization of a quarter of a million members. The policies of the Sierra Club concerning geothermal leasing on the public lands are the result of the work done by the Geothermal Task Force of the Club's National Energy Committee. The Geothermal Task Force was organized in May, 1976 to reflect a position of caution with regard to present geothermal technologies. As you may expect, our concern with geothermal leasing is largely a reflection of the Sierra Club's longstanding support for national parks, wilderness, wild and scenic rivers, and other areas where natural values are of high importance. Accordingly, rather than presenting today a detailed analysis of each of the bills before the Committee, I wish to present our specific concerns with regard to the consideration of geothermal leasing in and adjacent to these areas. The Sierra Club would like the opportunity to provide further, more detailed comments on the legislation in writing during the period in which the hearing record is open.

The earliest involvement of the Sierra Club in the consideration of geothermal energy development followed the consideration of 200 applications for geothermal leases on the 488,000-acre Island Park Geothermal Area (IPGA), which includes parts of Idaho, Montana and Wyoming. The IPGA's eastern boundary abuts

Yellowstone Park. Old Faithful Geyser, one of the world's most revered natural phenomena, is only 13 miles from the IPGA. Some of the park's lesser known thermal features are less than a mile from the proposed lease area. The Sierra Club's first concerns were whether the delicate and poorly understood plumbing system that had kept Old Faithful going extended beyond the park and could be interrupted by drilling in the IPGA.

At hearings held by Senator John Melcher, former Assistant Interior Secretary Robert Herbst testified, "We do not now know how much of a connection, if any, there is between the proposed lease areas and the thermal areas inside the park....Unless geothermal exploration and development is very carefully planned, monitored, and controlled, irreversible damage to the geothermal regime at Yellowstone is a distinct possibility." Herbst noted that of the ten world-ranked geyser areas, only three (including Yellowstone) are essentially undisturbed, four have been "adversely affected by man's activities," and three have been totally destroyed.

U.S. Geological Survey scientist Donald E. White has stated, "For any given geyser area, we have a choice of exploitation for geothermal energy, or non-exploitation for preservation of geysers. In general, we cannot exploit the geothermal energy of an area and also preserve its geysers." White's studies have led him to conclude that in at least four different areas, natural geysers have become inactive coinciding with geothermal exploitation. He has stated, "The natural discharge of water and heat is increased by two to ten times by most exploitation programs. Even a small production from wells--say, ten percent of natural discharge--bypasses the natural vents, and is almost certain to result in some changes."

In this country, the little-known Beowawa geyser in Nevada, once second to Yellowstone, was destroyed by geothermal exploration that occurred in the 1940's and 1950's. Even though commercial production of geothermal energy in the area was never achieved, all springs and geysers in the area had ceased flowing by 1961.

The Sierra Club has also been active in the dispute over leasing of adjacent National Forest lands and development of private lands near Lassen Volcanic National Park, California. Here, conservationists have expressed concern that private development could affect nearby Terminal Geyser and Boiling Springs Lake, as well as more distant geysers, such as Devil's Kitchen and Bumpass Hell. Yellowstone and Lassen National Parks are noteworthy because the geothermal features of these national parks are central to the purposes for which they were created. But they are not alone in terms of those parks which may be affected by future geothermal energy development. Studies by the Park Service have indicated that there are 21 park system units with significant thermal features. In all of these areas, the parks remain unprotected from development on adjacent lands and private inholdings.

The Sierra Club believes that geothermal legislation prepared by this Committee should include a complete ban on leasing in the Island Park caldera. Furthermore, we believe that a complete ban on leasing should occur within a five-mile range of the borders of Lassen Volcanic National Park. Beyond these two national parks of particular geothermal significance, we believe that no leasing should take place adjacent to any park until the Park Service and Geological Survey have mapped the extent of related geothermal features outside of the park and the Secretary of the Interior has made a finding that any geothermal leasing in those areas, based on the best available scientific advice, will not damage the geothermal resources within the park.

The Sierra Club also believes that there should be no geotheraml operations in areas known to provide habitat, feeding or mating grounds for rare or endangered species; areas designated as valuable for archaeological remains; units of the Wild and Scenic Rivers System; units of the National Trails System; and units of the National Wilderness Preservation System.

It is our belief that potential development of geothermal resources was not contemplated as being included in the 20-year mining law grace period included in the 1964 Wilderness Act. We believe that this legislation should make it explicit that geothermal development shall not take place in existing wilderness areas.

With regard to areas which have been recommended for inclusion in the National Wilderness Preservation System, such as those areas which have been recommended through the RARE II process, the Sierra Club believes that any decision to lease should be deferred until proper Congressional consideration of the wilderness proposal has been completed. Geothermal leasing which would destroy the wilderness character of the area should not preempt the Congressional prerogative to enact specific units of the National Wilderness Preservation System.

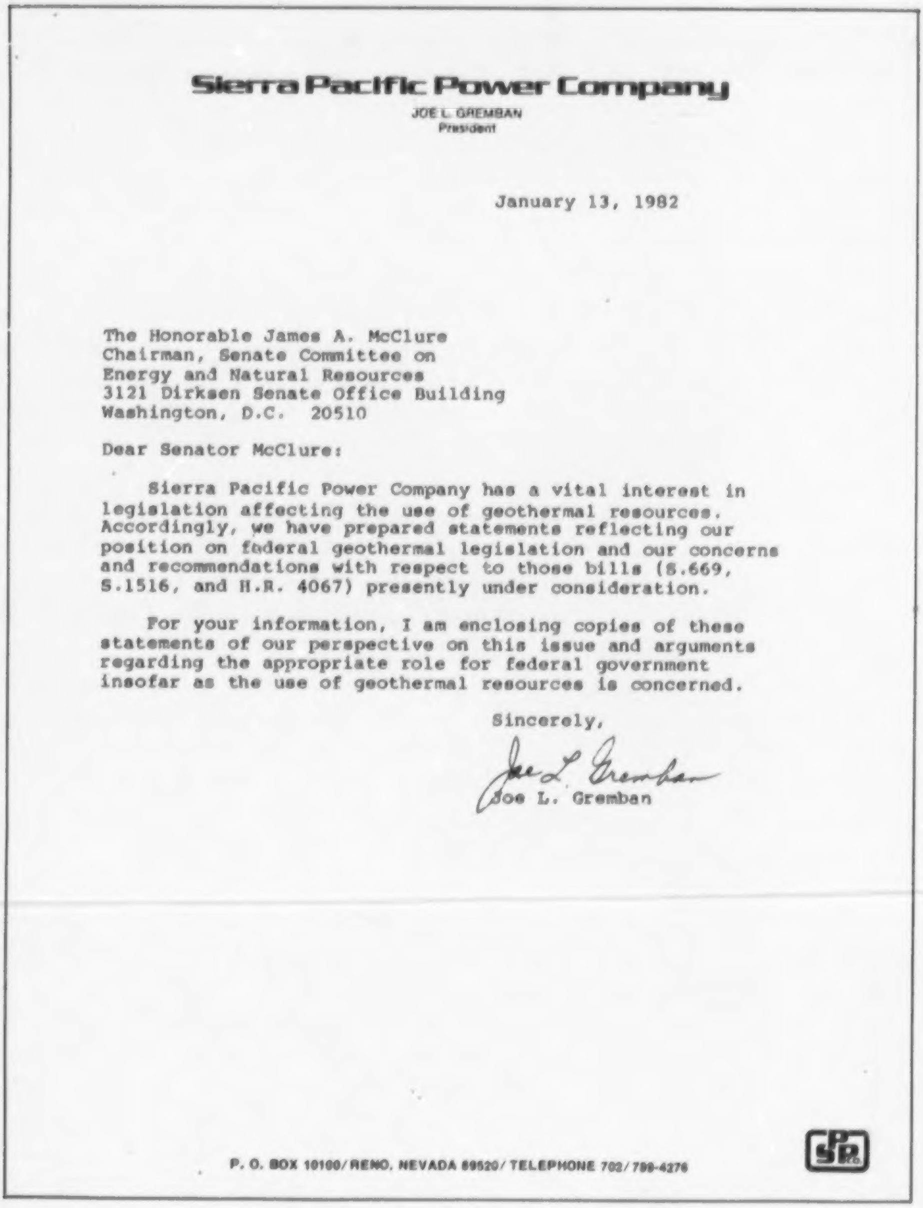
Currently, the Sierra Club has filed administrative appeals with the Forest Service concerning two roadless areas in the Mount Hood National Forest, Oregon, one of which has been recommended for wilderness, and one of which is a "further planning" area in RARE II.

It is also our belief that in areas which are "further planning" in national forests or which were inventoried as wilderness study areas by the Bureau of Land Management, leasing should be deferred pending completion of the study. If exploration should be necessary in the evaluation of these areas by the proper agency, it is our belief that any such exploration and testing activities should not impair the overall wilderness suitability of the area.

The restrictions on the above lands do not appear to us to be extensive or burdensome. They should not restrict proper geothermal development activities in areas best suited for energy development. On the other hand, they may help prevent further destruction of some of our nation's most important scenic and scientific natural geothermal phenomena.

In keeping with our overall views on energy conservation and development, the Sierra Club supports local use of small, light impact heat extraction units for space heating, industrial process heat and agricultural heating in regions where higher than normal heat flow exists. It is our hope that provisions such as the disparate royalty payments of Section 6 in S. 1516 do not enoucrage environmentally destructive electrical production at the expense of worthwhile local heating projects.

As I stated at the beginning of our testimony, we hope to present the Committee with additional specific comments on the legislation before the hearing record is closed. Thank you very much.



Sierra Pacific Power Company
JOE L. GREMBAN
President

January 13, 1982

The Honorable James A. McClure
Chairman, Senate Committee on
Energy and Natural Resources
3121 Dirksen Senate Office Building
Washington, D.C. 20510

Dear Senator McClure:

Sierra Pacific Power Company has a vital interest in legislation affecting the use of geothermal resources. Accordingly, we have prepared statements reflecting our position on federal geothermal legislation and our concerns and recommendations with respect to those bills (S.669, S.1516, and H.R. 4067) presently under consideration.

For your information, I am enclosing copies of these statements of our perspective on this issue and arguments regarding the appropriate role for federal government insofar as the use of geothermal resources is concerned.

Sincerely,

Joe L. Gremban
Joe L. Gremban

P. O. BOX 10100/RENO, NEVADA 89520/TELEPHONE 702/789-4276

Sierra Pacific Power Company

FEDERAL GEOTHERMAL LEGISLATION
POSITION OF
SIERRA PACIFIC POWER COMPANY

Sierra Pacific Power Company believes there is significant, potential benefit to its consumers from the cost effective development of geothermal resources. We feel that the production of electricity from geothermal resources is key to the beneficial use of the resource due to the flexibility of transport and use of electricity.

Generation plants can be located at the energy source. The resultant electric energy can then be utilized by all consumers connected to the electric system.

Sierra thus has a clear interest in legislation impacting the exploration and development of geothermal resources, and hopes that the following will receive serious consideration.

POSITION ON FEDERAL GEOTHERMAL LEGISLATION - SIERRA PACIFIC POWER COMPANY

"FEDERAL LEGISLATION SHOULD BE DESIGNED TO ENCOURAGE AND ACCELERATE THE USE OF GEOTHERMAL RESOURCES FOR THE BENEFIT OF CONSUMERS. THE FOLLOWING PRINCIPLES SHOULD BE APPLIED IN PREPARING FEDERAL LEGISLATION:

THE ROLE OF FEDERAL GOVERNMENT SHOULD BE:

- TO EFFICIENTLY ADMINISTER THE EXPLORATION AND DEVELOPMENT OF GEOTHERMAL RESOURCES ON FEDERAL LANDS THROUGH ISSUANCE OF LEASES.
- TO ENSURE REASONABLE PROTECTION OF THE ENVIRONMENT.
- TO ENCOURAGE EARLY TRANSITIONS FROM EXPLORATION TO DEVELOPMENT AND USE.
- TO ASSURE OPPORTUNITIES FOR REASONABLE COMPETITION IN EXPLORATION AND DEVELOPMENT.
- TO PROVIDE ECONOMIC INCENTIVES WHICH COMPENSATE FOR THE RISKS OF EXPLORATION, FIELD DEVELOPMENT, AND CONSTRUCTION OF GENERATION AND TRANSMISSION FACILITIES.

THE ROLE OF THE FEDERAL GOVERNMENT MUST NOT BE:

- TO ITSELF EXPLORE AND DEVELOP THE RESOURCE
- TO CREATE ARTIFICIAL MARKETS, OR TO GIVE PREFERENTIAL TREATMENT TO ANY ENTITY, PRIVATE OR PUBLIC."

APPLICATION OF THESE PRINCIPLES TO CURRENT LEGISLATION

Attached is a summary of Sierra's concerns and recommendations related to H.R. 4067, S. 669 and S. 1516. We urge consideration of the basic principles outlined above, as well as our specific recommendations on current bills.

P. O. BOX 10100 / RENO NEVADA 89510 / TELEPHONE 702/789-4011

FEDERAL GEOTHERMAL LEGISLATION RECOMMENDATIONS BY SIERRA PACIFIC POWER COMPANY

SUMMARY

H.R. 4067, S. 669 and S. 1516 are three bills before Congress which, if enacted, would adversely affect Sierra Pacific Power Company's future in geothermal resource development.

Contained herein are recommendations for the modification of those provisions of this legislation which create apprehension on the part of the company in the following major areas of concern:

1. Public power receives preferential treatment.
2. The push from the exploration side of the industry could inhibit the development side of the industry and result in a slower and more costly development of geothermal resources.
3. The door is opened for geothermal development by any federal agency for its use and/or benefit, possibly including development of electric generation for sale as well as use. Implications related to geothermal development by utilities and the use of transmission facilities are troublesome when considered in light of the very high percentage of federal land located in Nevada.

DISCUSSION AND RECOMMENDATIONS - H.R. 4067, S. 1516

H.R. 4067 and S. 1516, companion bills, propose several changes in the Geothermal Steam Act of 1970.

Change 1: The bills provide for the payment of a royalty of 10% to 15% for geothermal electric generation, while the royalty for other uses is 5% to 10%.

> Concern - This provision would unfairly penalize the generation industry and its consumers. Since energy in the form of electricity is more easily transported to areas of use, the greatest benefit to society at large may be through generation from geothermal resources. It is not logical that such a beneficial use be discouraged due to an arbitrary decision to increase the cost of generation.
>
> Recommendation - If any royalties are to be charged they should be equal. A more realistic approach would be to not charge any royalties in order to encourage development of the geothermal resources.

Change 2: The bills provide for a ten-year lease with an extension of ten additional years if either administrative delays or marginal economics can be demonstrated to have caused delay in construction of utilization facilities.

> Concern - This length of time may be too long to encourage development of resources. The longer the period allowed, the more likely it will be that developers may choose not to develop a resource, but rather to hold back for the maximum time period in anticipation of increased sales prices for geothermal resources.

Recommendation - The current ten-year term, with a possible five-year extension, is more than an adequate time period for development. There should be a provision for public comment on any extension considered, to allow for review by a third party such as Sierra Pacific Power Company, to preclude a developer from "sitting on" a producible lease.

Change 3: The bill provides for an increase from the current 20,480 acre maximum to a 51,200 acre maximum of exploration leaseholds that any one company may hold in any one state. Further, this amount may be increased by the Secretary to 115,200 acres after 1985.

Concern - This increase in the area that can be controlled by any one entity is not going to expedite the development of geothermal. Rather, it allows a company to control more area, resulting in fewer competitors in the sale of the resource. While the 20,480 acres provision may have been too small, the 115,200 acre provision is much too large.

Recommendation - 51,200 acres seems to be an equitable number. The provision for increase by action of the Secretary should be deleted.

Change 4: If a lease (2,500 acres) can be shown to be capable of production, it does not count in the acreage limitation.

Concern - This provision could encourage the misclassification of the real potential of a lease. In addition, the change would decrease the incentive to develop.

Recommendation - Drop this provision altogether or modify it so as to exclude producing leases from the acreage limitation.

Change 5: Leases will be reviewed by the Secretary every twenty years. (This is an increase from the current ten year review schedule.)

Recommendation - While we agree that the longer period conforms more closely to plant/resource life, we urge that the nature of the review and the bases for renewal of leases be clarified.

Change 6: No royalty payment is required for any noncommercial uses of geothermal resources.

Concern - This provision will not put potential geothermal uses on equal and competitive grounds. The result is a possible nonoptimal development of geothermal resources.

Recommendation - Geothermal resources should be treated as energy resources with no distinction among developers as to royalty payments.

Change 7: Federal agencies are encouraged to develop the resource if it will not deter commercial development.

Concern - The provision for federal agencies' "...use or benefit..." is far too broad, opening the door for development for energy sales. Further, the determination of whether federal agencies' development would deter commercial development is left solely to the agency and the Department of Interior. This provision is totally illogical.

Recommendation - The federal government should not actively participate in any phase of resource exploration or development. It should be involved in the proper administration of federal lands that have potential geothermal resources.

DISCUSSION AND RECOMMENDATIONS - S. 669

S. 669 proposes the following additional changes in the Geothermal Steam Act of 1970:

Change 1: No royalties from users if the resource is used for residential, small business or farm, but only if the resource is not used for electric generation in these instances.

Concern - This could encourage some uses of geothermal at the expense of other potentially more economic uses by imposing a discriminatory royalty structure. This is not the proper course to follow in the economic development of a new technology.

Recommendation - See comment on Change 6, H.R. 4067

Change 2: Federal agencies would get a first right to a resource if it would not hamper other commercial use. In addition, the agency may sell excess amounts of the resource to the surrounding community.

Concern - The federal government should not be entitled to any preference in the resource allocation. The bill actually encourages the government to sell the resource and/or get into the energy business.

Recommendation - Federal government activities should be strictly limited to the fair, nondiscriminatory administration of these lands.

Change 3: 10% of federal lands shall be available to publicily-owned bodies.

Concern - This type of preference has led to unfair treatment of all ratepayers in the past (hydroelectric preference).

Recommendation - No preference should be given to one entity over any other. There is no justification for the 10% federal land allocation to publicly-owned bodies.

STATEMENT OF
NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION
on S. 1516 to amend the Geothermal Steam Act of 1970
before the
SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES
of the
U.S. SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
October 27, 1981

Mr. Chairman and Members of the Committee: My name is Lowell J. Endahl, manager of Energy R&D for the National Rural Electric Cooperative Association (NRECA). With me is Richard Sternberg, NRECA Fuels Coordinator. We appreciate the opportunity to present the NRECA membership views with respect to the leasing provisions in S. 1516, the bill to amend the Geothermal Steam Act of 1970 to expedite exploration and development of geothermal resources.

Specifically we would like to comment on:

- The interest of rural electric systems in geothermal resource development;
- The need for set asides of reasonable portions of the known geothermal resource areas (KGRA) for development by non-profit and public entities; and
- The acreage limitation on geothermal leases.

NRECA is the national service organization which represents nearly 1000 non-profit, consumer-owned rural electric systems which deliver electric power to approximately 25 million people in the rural and sparsely populated agricultural areas of 46 states. These small cooperatively-owned electric utilities are located in about 2,600 of the nation's 3100 counties, and they own and operate more than 40% of the distribution line in the nation serving about 9% of the population. Many of the rural electric systems serve in or are adjacent to known geothermal resource areas.

The interest of rural electric systems in geothermal resource development was evidenced by the attendance and participation of some 100 rural electric officials from 12 Western states at the special workshop on "Use of Geothermal Energy for Electric Power Generation" in San Diego a year ago. NRECA sponsored that workshop which was made possible by a Department of Energy Conference Grant.

One of NRECA's member systems, Raft River REC, Malta, ID has been one of the pioneers in geothermal development, working as a partner with the Department of Energy (and before that the Energy Research and Development Administration) in the development of the binary cycle plant. The binary cycle plant uses geothermal water (at temperatures about 300°F) to heat a "working fluid" (at Raft River a refrigerant known as isobutane is used) to boiling so the resulting high pressure steam can spin a turbine. The attached feature from September 1980 Rural Electrification gives details of that involvement.

Another member system, Plains Electric, a generation and transmission cooperative located at Albuquerque, NM has been involved in a feasibility study and research program with the Department of Energy in extracting energy from hot rock formations. As the technology is developed to open up new geothermal resources, we can expect rural electric systems to become more actively involved.

From these activities it is apparent that rural electric system interest in the development of geothermal resources as a source of electric power for their member consumers is high. They see the potential (as in the case of hydro power where it is available) for geothermal power production as a way to reduce dependence on imported oil, and to provide electric energy to consumers at prices that are not tied to the escalating costs of imported oil.

We believe that the development of the nation's geothermal resources should be done in a way that will produce electricity at the lowest possible cost. The philosophy employed in the development of the leasing program, in our opinion, will be the key to whether or not that will be possible.

If the entire leasing effort of known geothermal resource areas is based on competitive bidding, the natural result, it seems to us, will be that the price of energy from geothermal resources (as is the trend with gas, coal and other energy sources) will follow the price levels of imported oil. The same companies that are engaged in the exploration and production of oil and gas are almost certain to be the successful high bidders for known geothermal resources. While that will enhance the government coffers, it is not likely to benefit electric consumers. Some system is needed to provide a "yardstick" for assessing the true cost of developing geothermal resources. A preference provision in leasing to public and non-profit organizations could provide that yardstick.

Preference Provision

A preference provision similar to the language set forth in Section 126 (h) of S. 669 (with some revisions) would seem to be in order. Precedence for this is in the Federal Coal Leasing Admendments Act of 1976 (30 U.S.C. 201 a).

We would suggest the following:

"A reasonable number of leasing tracts, not less than 10 per centum or more than 20 per centum of the acreage leased in "known geothermal resource areas" in any year, shall be offered on the basis of a specific application for such tract to public bodies, including electric cooperatives, or non-profit corporations controlled by and predominantly made up of any of such entities."

A provision might also be included to make such set-aside tracts available for competitive bidding if efforts to develop the tracts are not demonstrated or if applications are not received within ten years.

A provision for "deferred bonus bidding" should also be included. Most public bodies do not have readily available the front-end financing required for long term leasing programs. The "deferred bonus bidding" provision would be beneficial to the electric cooperatives since it would permit the Rural Electrification Administration (REA) to loan the funds necessary for acquiring fuel reserves at the same time the loan for the construction of the power plant is granted. REA is currently limited to approving loan applications for fuel reserves in fairly specified amounts for specific power plants. Since an assured fuel supply for a prospective power plant should be acquired far in advance of the time construction of the plant is initiated, a payment schedule that defers payment of most of the bonus until after the lessee begins production would diminish the need for higher interest "front end" financing.

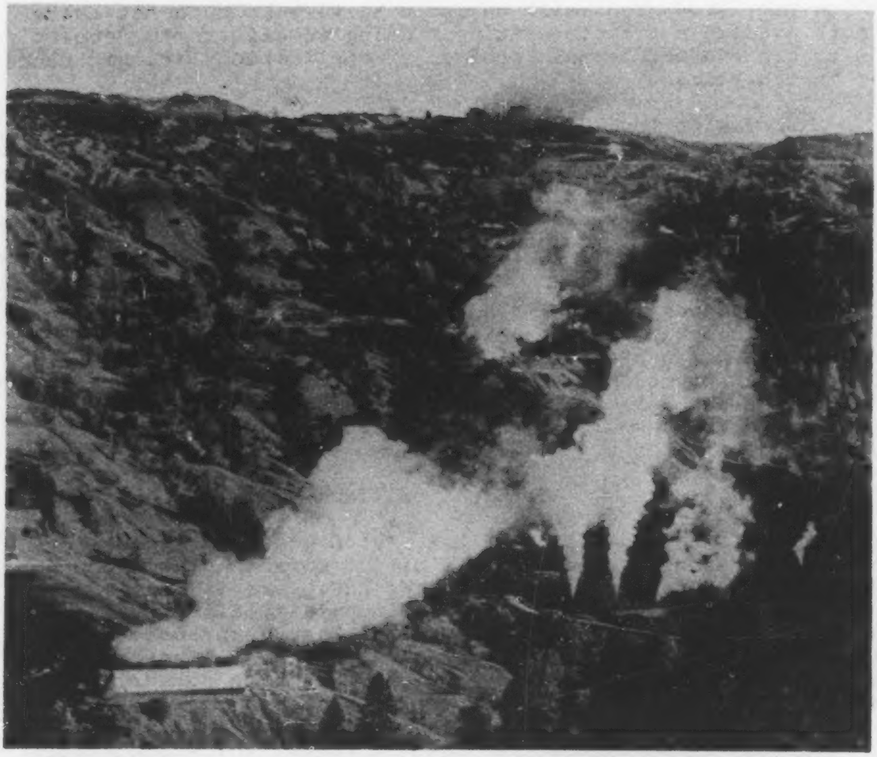
Acreage Limitation

S 1516, Section 7 states that "(a) A geothermal lease shall embrace a reasonably compact area of not more than two thousand five hundred and sixty acres,..." We have some indication from Plains G&T, which has been involved in a feasibility study and research program with the Department of Energy and the Los Alamos National Laboratory that 2560 acres may not be a large enough area for leasing purposes--particularly with the hot dry rock technology which requires a fracturing process.

We also raise a question about Section 7 (b) which states that "At any time after fifteen years from the effective date of the Geothermal Steam Act of 1970, the Secretary, after public hearings, may increase this maximum holding in any one State by regulation, not to exceed one hundred fifteen thousand two hundred acres." We suggest that this be changed to become effective fifteen years from the date of enactment of the amended legislation.

The development of geothermal resources can be expected to make a significant contribution to the energy needs of this nation, and rural electric systems would like the opportunity to participate in this development. We respectfully request the changes outlined in order to make our participation possible.

Thank you for the opportunity to present these views on behalf of the rural electric cooperatives of the nation.



The Geysers

EPRI photo

GEOTHERMAL

The awkward but exciting member of the energy family

By Frank K. Gallant

GEOTHERMAL energy—literally earth heat—is the awkward member of the energy family. It is not as though the resource were only newly discovered: long before anyone had the faintest inkling there were other, more reliable fuels buried in the earth's crust, the Romans used geothermal water in their famous hot baths. It is because the highest quality reserves are few and already being used to generate electricity, and technology hasn't caught up with geologists' appreciation for the potential of the lesser lower temperature reserves.

But the pace is picking up. Aided by federal financing and growing interest by private enterprise, more and more is being spent on hot water prospecting and drilling and energy-producing technology. Last May the Department of Energy granted the largest geothermal loan guarantee in its four-year history—$49.4 million to a California consortium to drill in the Imperial Valley. In all, DOE will spend about $150-million on geothermal this year, not including funds loaned under the federal guarantee.

A pilot low temperature geothermal electric generating plant is operating in California, another will begin operating in Idaho this fall, and at least one research and development company is working on a way to make low temperature generations 35% more efficient.

By the year 2000, the Energy Department estimates, some 25,000 megawatts of electricity could be

Reprinted from September 1980 issue of ***RURAL ELECTRIFICATION***

GEOTHERMAL GREENHOUSE

Raft River Co-op members Joy and Gary Crook use geothermal water to heat their commercial greenhouse. Joy figures this saves them about $900 a month they would otherwise have to spend on fuel oil or gas. The greenhouse is within view of the Raft River geothermal power plant. Joy says the 220-degree (Fahrenheit) water that comes out of the well beside their trailer home is not nearly as warm after it circulates through heat exchangers inside the greenhouse, but it is still hot enough to maintain the greenhouse at 50 degrees when the temperature in Malta, Idaho, drops to −20 degrees. During canning season, Joy uses the water to blanche tomatoes. A neighboring rancher claims his cattle don't have to eat as much hay to keep warm in the winter when they drink geothermal water. If nothing comes of the offer Gary and Joy have had to sell their property to a company that wants to use the water for heat in a million-gallon-a-year alcohol fuel still, they plan to continue growing poinsettias, Easter lilies, mums and other potted flowers and vegetables in their geothermal greenhouse.

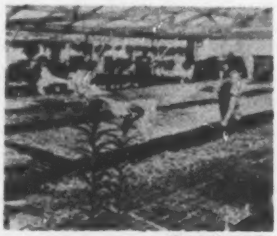


Photo by Frank Gallant

produced from geothermal, enough to displace a million barrels of oil a day. Current commercial capacity is 665 megawatts.

All of that capacity is situated 90 miles north of San Francisco, where Pacific Gas and Electric began generating with an 11 megawatt plant in 1960. The Geysers, as the site is called, is the largest known "dry steam" field in the world. The 665 megawatt plant there is also the largest. The second largest plant in the world, 420 megawatts, is at Larderello, Italy, where in 1904 geothermal dry steam was first used for commercial generation of electricity.

Natural hot water was used even earlier for central station space heating. Just before the turn of the century, residences along Boise, Idaho's Warm Springs Avenue were being heated with 170-degree (Fahrenheit) water. By the 1930s, 400 homes and businesses in the city were being heated in this way. Today, the city of Boise is embarking on a $15-million program to expand the system, which during the cheap oil and gas era had shrunk to about 220 residences. The Department of Energy is financing about a third of the project.

Dry steam occurs where geologically recent volcanic activity opened fractures in the earth's crust allowing rainwater to percolate deeply and come in contact with very hot rock (magma, the molten material rising from deep within the earth that when it reaches the surface is called lava). Old Faithful, the famous geyser in Yellowstone National Park, is an example of the result. The spectacular eruption of Mount St. Helens, where steam had been building up for 123 years, is another example.

DOE photo by Jack Schneider

Drilling for hot underground water at the Ocean City, Md., airport.

Dry steam is the most obvious and easy-to-use form of geothermal energy. Unfortunately, it is also the rarest form, comprising, perhaps, as little as one-half percent of the U.S. geothermal resource, according to the Electric Power Research Institute (EPRI).

Closely related to dry steam is geothermal hot water, which represents about 10% of the estimated U.S. resource base. Hot water reservoirs are heated in the same way as geysers or hot springs but lie under layers of impermeable rock and so cannot be utilized without drilling wells.

Generating electricity with geothermal hot water is more complicated than with dry steam. The temperature is usually lower, and minerals in the water cause scaling on generating equipment. Much of today's geothermal research focuses on improving hot water generation.

The two other types of geothermal resources are geopressured water and hot dry rock, both as yet untapped. Lower in temperature than dry steam and hot water, geopressured water systems occur where water is trapped under layers of impermeable shale heated by conduction from the rocks below. These reservoirs usually also contain dissolved methane. Geopressured water, EPRI estimates, makes up

20% of the U.S. geothermal resources, with the better-known systems along the Gulf coasts of Texas and Louisiana. The economic feasibility of recovering this water (or the methane) has not yet been established.

Hot dry rock—magma lying relatively close to the surface—represents nearly 70% of our geothermal resource. Where the earth's crust is thin or has been disturbed by recent volcanic activity, hot rock at temperatures of 400 degrees Fahrenheit or above often lies only 10,000 feet below the surface, within reach of conventional oil drilling equipment. Steam (or hot water) for electric power generation is produced from hot dry rock by injecting cold water down a well pipe to the magma chamber and then piping the resulting steam up a second well and into the power plant. The process is not nearly as simple as it sounds; the technology that will make hot dry rock economical is years away.

The U.S. Geological Survey has mapped hot water geothermal aquifers beneath 24 states; about a dozen sites in the West and Southwest are being seriously considered for their electricity generating potential. "If electric utilities could tap just those geothermal resources whose presence has been inferred from actual drilling and that appear economically attractive with today's technology," an EPRI special report says, "an estimated 11-million kilowatts of power could be generated for a period of at least 30 years." That is enough electricity to meet the day-to-day needs of 11-million people and to reduce American demand for oil by some 164-million barrels a day.

Bud Tracy, assistant manager of Raft River REC in Malta, Idaho, has been familiar with geothermal energy for most of his life. As a boy he helped his father scald hog carcasses in a hot spring just south of Malta. This fall he is helping co-op manager Golden Gardiner assemble a staff of technicians to operate a five-megawatt geothermal power plant not far from that hot spring. Built by an Idaho engineering company for DOE, the plant will be operated by a consortium of six northwestern utilities of which Raft River Co-op was a founding member. The plant is only the second of its kind—binary cycle—to be built in this country and is being test run this fall.

A binary cycle plant uses geothermal water to heat a "working fluid" (at Raft River a refrigerant known as isobutane is used) to boiling so the resulting high-pressure steam can spin a turbine generator. The Raft River plant uses 290-degree (Fahrenheit) water from wells up to 6,000 feet deep. Heat exchangers are used to transfer heat from the water to the isobutane.

The only other binary cycle plant began operating last year in East Mesa, Calif., near the Mexican border. It is owned by Magma Power, the company that developed the Geysers. If everything goes as planned, the Raft River and East Mesa plants will demonstrate that medium-to-low temperature geothermal water, plentiful in the West and in the world, is a practical heat source for generating electricity. Magma officials predict that such plants can be built for $600 a kilowatt, or less than half the cost of a nuclear plant. The East Mesa plant, though small and experimental, cost only $900 a kilowatt, they say.

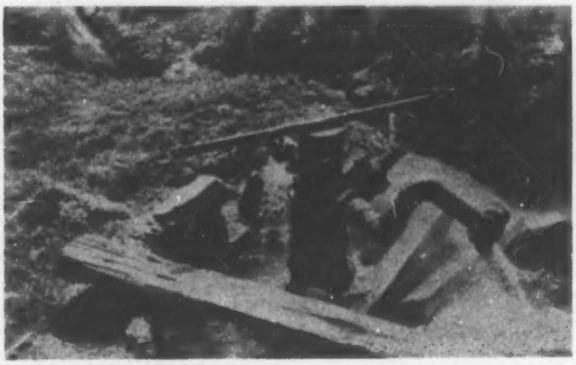


Photo by Frank Gallant

Old geothermal well at Bridge Spring, not far from the Raft River geothermal power plant.

Nearly 85% of the co-op's load goes for irrigation; the Raft River Valley averages only 12 inches of precipitation a year, and the backbone of the economy is agriculture—grain, hay, potatoes, sugar beets, cattle. Ten years ago, then-co-op Manager Edwin Schlender could see that hydroelectric power in the Northwest was being spread thinner and thinner, and there would soon be a need for other forms of generation.

He knew about the hot spring at the southern end of the valley, and he knew about two capped geothermal wells that had been drilled more than 50 years before by someone looking for drinking water. He wanted to find out the extent of the reservoir and its energy-producing potential.

The co-op found that water rights were the first thing that was needed and got the approval of the membership to spend some $50,000 to purchase the rights on 100,000 acres. When the co-op couldn't interest any geothermal or oil companies in doing a geological investigation, it asked the Atomic Energy Commission. The co-op and the Snake River Power Association began the geological work and then the AEC brought in the U.S. Geological Survey. Later, when the reservoir was proved, the Department of Energy built the experimental power plant.

Altogether the co-op spent about $200,000 on development of the resource and another $300,000 to bring electricity to the power plant, according to Tracy. The co-op will hire six or seven new employees for its part in the operation of the plant; in all, the plant means about 18 new jobs for the valley, he says.

For a long time after DOE began its work in the valley it seemed as though the co-op was being squeezed out of the project it had initiated. The consortium had to fight hard for the right to operate the plant. But Tracy believes the

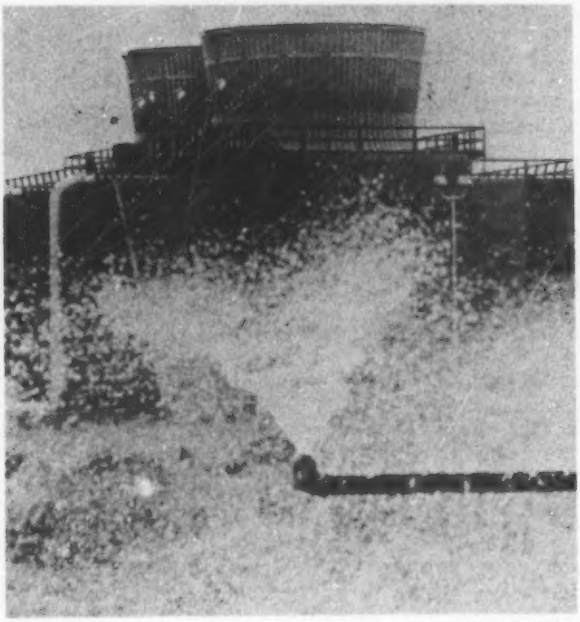


Photo by Frank Gallant

Raft River geothermal power plant in Malta, Idaho.

fight was well worth it.

"I think that down the road there's going to be a demand for power wherever you can get it," he says. "And this is really a proving ground for geothermal for the whole Northwest. It may just give us the experience to determine whether we want to stay in or get out."

Raft River REC is one of more than a dozen rural electric cooperatives that have contributed to the development of local geothermal resources, both for generating electricity and space heating. One that has been involved in geothermal almost as long as Raft River is Plains Electric, a generation and transmission cooperative based in Albuquerque, N.M.

DRY steam is the only proven form of geothermal energy. There are still technical, legal, environmental and economic barriers in the way of rapid development of hot water and hot dry rock. A measure of the significance of these barriers is that while tens of thousands of oil and gas exploration wells are drilled each year less than 100 geothermal wells are drilled.

Oil and gas companies enjoy tax incentives for the costs of exploration; so far there are none for geothermal drilling. About 60% of the known U.S. geothermal resources lie under federal lands and, industry people claim, the agencies have been extraordinarily slow in granting permits for geothermal prospecting. And the cost of geothermal drilling is roughly three times that of oil and gas drilling even though similar equipment is used. This is because geothermal drilling takes place in igneous rock, which is much harder than the sedimentary rock that overlies oil and gas deposits.

Also, this is not a particularly good time for the trials and errors necessary to the development of a new energy resource. Environmental awareness and the regulatory effort that goes with it today, make the atmosphere in which geothermal exploration and power generation must grow up as different from the early days of the oil industry as night is to day.

The major environmental hazard associated with geothermal steam is emission into the atmosphere of hydrogen sulfide gas, which has an obnoxious (rotten egg) odor and can be toxic. According to EPRI, 20% to 25% of geothermal water contains hydrogen sulfide. The concern about hot dry rock is that reservoir development may induce local seismic activity.

But compared to oil or gas or coal, geothermal so far does not appear to significantly threaten the environment. There is no mining involved, no chance of spills, no pipelines, no flooding of lands, no real disturbance of animal habitat, no burning of fuels. There are no wastes.

In a binary system geothermal power plant the geothermal water is never introduced into the atmosphere. It comes out of the ground in a pipe and, after transferring its heat to the working fluid, is reinjected into the earth. The water moves through a completely closed system.

The disadvantage of this system is that unlike geothermal steam plants, binary plants do not produce their own cooling water. With water already scarce in the West, industry officials fear that the lack of cheap, available cooling water could impede rapid development of the resource. An inexpensive supply of water is also essential to the development of hot dry rock, where water has to be injected into the ground to be heated.

The best thing about geothermal is that it is renewable and theoretically inexhaustible. At the Geysers it is producing electricity at two-thirds the cost of oil or coal generated electricity. What is needed now is for hot water plants like the ones being operated by Raft River REC and Magma Power, and hot rock experiments like the one Plains Electric is involved in, to prove the economic feasibility of generating electricity with the much more abundant lower grade geothermal reserves. □

Written Testimony Submitted
by
Republic Geothermal, Inc.
to the
Senate Energy and Natural Resources
Subcommittee on Energy and Mineral Resources

October 26, 1981

Republic Geothermal, Inc. (RGI) is submitting this written statement in support of S. 1516, a bill introduced by Senator Warner and Senator McClure, to amend the Geothermal Steam Act of 1970 (the Act). RGI is a fully integrated geothermal resource development company engaged in land acquisition, exploration, drilling, steam and power production and research activities.

During the last Congress, representatives of RGI testified before the Senate Energy and Natural Resources Committee and the House Committee on Interior and Insular Affairs in general support of legislative proposals designed to expedite the leasing of federal lands for geothermal energy development.

Republic believes that the proposal (S. 1516) now before the Committee, which has been modified significantly from that measure reported out of the Senate last year, is very acceptable and urges its adoption with only the slight modification suggested below. In our judgment, enactment of the proposal would greatly facilitate the leasing and development of geothermal prospects on federal lands. This will be accomplished by significantly narrowing the definition of "known geothermal resource area" (KGRA), eliminating disincentives for non-competitive lease applicants to explore those lands under application, increasing the allowable acreage limitation per state, and extending to twenty years the period for review and adjustment of lease terms.

With respect to the provisions of S. 1516, Republic would like to specifically comment upon the following sections:

1. Section 4, which redefines, in section 2(e) of the Geothermal Steam Act of 1970, "known geothermal resource area" (KGRA);
2. Section 5, which amends section 4 of the Act by giving non-competitive lease applicants priority in, or exemption from, the competitive bidding process if the lands under application are designated as a KGRA subsequent to the lease application being filed;
3. Section 8, which amends section 7 of the Act by increasing from 20,400 to 51,200 the acreage per state of federal lands available for geothermal leasing to any one entity and which also permits the Secretary of Interior, after 1985, to increase the available acreage per lessee to 115,200 acres per state; and,
4. Section 9, which amends section 8 of the Act by extending periods of review and adjustment of lease terms and conditions from ten to twenty years.

Definition of KGRA:

Section 4 of S. 1516 redefines "KGRA" so that designation of an area as a KGRA is based upon a finding that substantial physical evidence exists that there are geothermal resources in the area sufficient to engender a belief that the prospects for generating electricity in commercial quantities warrant substantial expenditures. This definition eliminates the "competitive interest" test which has resulted in the creation of many isolated KGRA's which, when offered for sale, have not generated any bids. Section 5 of S. 1516 would also limit the number of leases offered by competitive bidding by automatically declassifying those KGRA lands receiving no bids. Although these two changes may decrease the number of competitive leases eventually issued, and thus result in a potential loss of revenue from bonus bids, the Treasury will be more than compensated by the timely accumulation of both rentals and royalties which will be derived from these non-competitive leases. Republic recommends enactment of these two changes.

Protection for Non-Competitive Lease Applications:

Present law includes the inequity of having a non-competitive lease application rejected on the basis of the lands being designated as a KGRA long after (in one recent case nearly seven years after) the filing of the application. Section 5 of S. 1516 corrects this inequity by granting to the applicant the non-competitive lease if the lands are not designated as a KGRA within one year of the application being filed. Further, section 5 of S. 1516 grants the applicant the right to match the highest competitive bid for the parcel (if the lands are designated a

KGRA within one year of the application being filed) or the right to the non-competitive lease itself if the applicant was responsible for the exploration which resulted in the designation of the lands as a KGRA. The possibility of lands being designated a KGRA, thereby invalidating previously filed non-competitive lease applications, has been a major impediment to prudent operators undertaking exploration operations on or near lands upon which they have unprocessed lease applications. RGI strongly endorses Section 5 of S. 1516.

Increased Acreage:

While RGI supports and encourages affirmative Congressional action to increase the amount of acreage which can be held in each state by any one entity, we would urge the Committee's consideration of an acreage limit in excess of the 51,200 acres per state as now provided in section 8 of S. 1516.

There appears to be no justification for settling upon the 51,200 acres. Indeed, this amount seems to have been chosen simply because legislation in the last Congress settled on that number. At a minimum, we would urge the Committee to carefully examine the rationale for the 51,200 acre per state limit. It should be emphasized that the economic success of small companies like Republic, (that is, companies which are solely engaged in the exploration and development of geothermal energy and not involved in any other business) will be greatly influenced by a rational, well-grounded federal lands policy. We therefore believe that federal lands policy should include a recognition of the business realities of geothermal development by small-scale geothermal companies.

RGI would recommend that the language of section 8 of S. 1516 be amended so that, at a minimum, the Secretary of Interior has the immediate discretionary authority to raise the acreage limit in any one state to 115,200 and that, by 1983, the acreage limit per state be set at 115,200. This recommendation is made for the following reasons:

First, although the geothermal energy underlying as little as 1,000 acres of land may be technically sufficient to ensure that enough geothermal reserves are available to last the economic life of a commercial-sized geothermal power production facility, utilities considering a commitment to purchase geothermal resources can be expected to require the developer to control many times the geothermal reserves necessary for one power plant. Utilities make this requirement to ensure not only that the reservoir is capable of supplying energy to the power plant for its entire economic life, but also that the reservoir is large enough to make economic the construction of expensive new electric transmission lines into the area. Thus, a geothermal resource developer, in order to develop the resources in the most expeditious manner, needs to control a significantly large portion of the geothermal reserves in any one reservoir. Typically, this will mean controlling from 5,000 to 10,000 acres in any one prospect.

Second, the technology for discovering and quantifying geothermal resources has not been developed to nearly the degree of sophistication as now found in oil and gas exploration. Geophysical and geochemical techniques can only generally outline those areas which have a potential for geothermal resources and which should, therefore, be leased. These areas, typically ranging from 20,000 to 30,000 acres in size, must be controlled by the geothermal resource developer in order to ensure that the core of the geothermal reserves are eventually found to lie within the area. Subsequent to leasing, the drilling of temperature gradient holes and deep resource wells will eventually narrow down the geothermal prospect from 30,000 acres of potential geothermal resources to 5,000 to 10,000 acres of actual geothermal reservoir and geothermal reserves. However, the drilling of temperature gradient holes and deep resource wells may take from two to five years to complete subsequent to leasing, and for each geothermal prospect on which a well capable of commercial production is drilled, probably five prospects will have been drilled which did not produce geothermal resources in commercial quantities.

This means that typically a geothermal developer may have to identify and lease six new prospects of approximately 25,000 acres per year, and hold on to these prospects for approximately five years while conducting exploration operations, in order to find one prospect of about 5,000 to 10,000 acres which is capable of commercial production. Even an acreage limitation of 51,200 acres will allow a geothermal developer only two prospects per state. Once these two prospects are identified and leased a geothermal developer cannot conduct additional initial exploration or leasing activities in that state until the orderly process of detailed resource exploration identifies the true extent of the geothermal resource and allows the geothermal developer to decrease the amount of acreage necessary in that particular prospect. The acreage limitation needs to be significantly increased above the 51,200 acre level so that the limited number of companies that are technically and financially able to explore and develop geothermal resources can do so in an orderly and continuous fashion.

In addition, we would note that:

1) Increasing the size of the acreage limitation will also likely increase the size and rate of revenue intake for the federal government through the collection of rentals and royalties. It will certainly increase revenues for local governments since once a lease is issued that property is subject to local taxes.

2) Increasing the geothermal lease acreage limit will stimulate geothermal exploration and help identify those areas where geothermal resources, although not suitable for the production of

electrical energy, may be applicable for direct heat applications such as space heating and food or industrial processing.

3) The Geothermal Steam Act of 1970 contains certain due diligence requirements which over the life of a lease adequately control speculation and insure that leased lands are explored and developed and not simply held for speculation. Thus, increasing the acreage limitation will not lead to speculation in geothermal leases. It should also be noted that, contrary to the concerns expressed by some, increasing the acreage limitations will not alter the ability of certain groups to engage in speculation by controlling large numbers of geothermal leases (similar to the speculation which is attributed to the acreage now controlled by the Hunt family). This type of speculation is possible for a limited period no matter what the size of the acreage limitation.

Lengthening the Geothermal Lease from Ten to Twenty Years:

The utilization of geothermal resources for the commercial production of electricity usually requires a developer to sign a long-term contract with a utility which will purchase the resource and construct a facility to generate electricity. This long-term relationship is made necessary by the inability of the utility to switch to alternative fuels should problems develop with the supply of the geothermal resource. As many utilities consider the ability of the Secretary to revise the terms of the lease at ten-year intervals to be one potential disincentive to entering into a long-term contract, Republic recommends that the proposal to extend the lease revision period to twenty years contained in S. 1516 be enacted.

Conclusion:

S. 1516, with the modification to the acreage limitation as suggested above, is a welcome and needed amendment to the Geothermal Steam Act of 1970. Although enacted some eleven years ago, the success of the 1970 Act has still to be evidenced; no federal lease is providing the resource for commercial electrical power production. Republic Geothermal believes that the changes called for by S. 1516 and further modified herein can assist our infant industry in more rapidly developing an indigenous energy resource.

○